Vol. 1118 Number 2

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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1790 ***Celebrating 200 Years of Creativity*** 1990

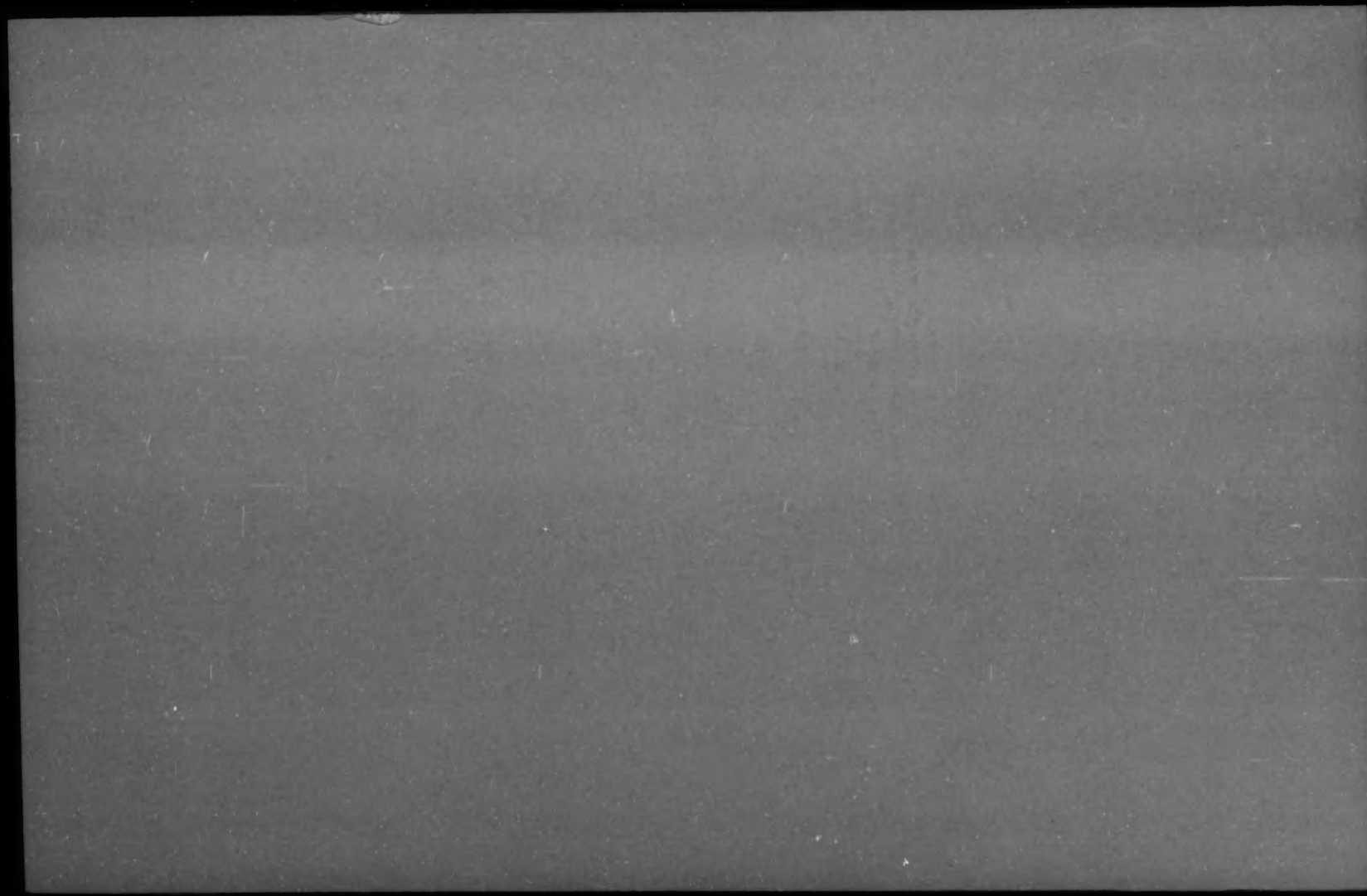
PATENTS

September 11, 1990

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS



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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on September 1, 1990, due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Aug.16, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Patent Cooperation Treaty (PCT) Update Withdrawal of Chapter II Declaration by Republic of Korea

On June 1, 1990, the Republic of Korea (South Korea) notified the International Bureau under PCT Acticle 64(6)(b) of the withdrawal of its declaration under PCT Article 64(1)(a) that it shall not be bound under the provisions of Chapter II of the PCT. Therefore, the Republic of Korea will be bound by the provisions of Chapter II of the PCT as of September 1, 1990.

The withdrawal of the said declaration by the Republic of Korea has the effect that, beginning on September 1, 1990:

(a) nationals and residents of the Republic of Korea may submit demands for international preliminary examination of international applications filed by them;

(b) the Republic of Korea may be elected in demands for international preliminary examination or in later elections submitted in respect of international applications in which the Republic of Korea is a designated State;

(c) paragraphs (a) and (b) apply irrespective of whether the international application designating the Republic of Korea was or will be filed before, on, or after September 1, 1990.

August 16, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commisioner of Patents and Trademarks

Patent Cooperation Treaty Update Accession by Greece

The United States Patent and Trademark Office has received notification from the World Intellectual Property Organization that Greece deposited its instrument of accession to the Patent Cooperation Treaty (PCT) on 09 July 1990. Therefore, according to PCT article 63(2), Greece may be designated in international applications filed on and after 09 October 1990.

The instrument of accession contains a declaration that Greece will not be bound by Chapter II (concerning international preliminary examination) of the PCT. This means that Greece may not be elected for international preliminary examination; however, if Greece is designated in the international application

for a European patent together with at least one other State party to the European Patent Convention which is bound by Chapter II of the PCT, the 30-month time limit for entry into the regional phase before the European Patent Office under PCT Article 39(1) applies also with respect to Greece, if the other State has been elected prior to 19 months from the priority date.

Listing of PCT Member Countries

Country	Ratification or Accession	Date of Ratification or Accession	Effective Date
(1)Central African Republic*	Accession	15 September 1971	01 June 1978
(2)Senegal*	Ratification	08 March 1972	01 June 1978
(3)Madagascar	Ratification	27 March 1972	01 June 1978
(4)Malawi	Accession	16 May 1972	01 June 1978
(5)Cameroon*	Accession	15 March 1973	01 June 1978
(6)Chad*	Accession	12 February 1974	01 June 1978
(7)Togo*	Ratification	28 January 1975	01 June 1978
(8)Gabon*	Accession	06 March 1975	01 June 1978
(9)United States of America	Ratification	26 November 1975	01 June 1978
(10)Germany, Federal Republic of**	Ratification	19 July 1976	01 June 1978
(11)Congo*	Accession	08 August 1977	01 June 1978
(12)Switzerland**	Ratification	14 September 1977	01 June 1978
(13)United Kingdom**	Ratification	24 October 1977	01 June 1978
(14)France**	Ratification	25 November 1977	01 June 1978
(15)Soviet Union	Ratification	29 December 1977	01 June 1978
(16)Brazil	Ratification	09 January 1978	01 June 1978
(17)Luxembourg**	Ratification	31 January 1978	01 June 1978
(18)Sweden**	Ratification	17 February 1978	01 June 1978
(19)Japan	Ratification	01 July 1978	01 October 1978
(20)Denmark**	Ratification	01 September 1978	01 December 1978
(21)Austria**	Ratification	23 January 1979	23 April 1979
(22)Monaco	Ratification	22 March 1979	22 June 1979
(23)Netherlands**	Ratification	10 April 1979	10 July 1979
(24)Romania	Accession	23 April 1979	23 July 1979
(25)Norway	Ratification	01 October 1979	01 January 1980
(26)Liechtenstein**	Accession	19 December 1979	19 March 1980
(27)Australia	Accession	31 December 1979	31 March 1980
(28)Hungary	Ratification	27 March 1980	27 June 1980
(29)Democratic People's Republic of Korea (North Korea)	Accession	08 April 1980	08 July 1980
(30)Finland	Ratification	01 July 1980	01 October 1980
(31)Belgium**	Ratification	14 September 1981	14 December 1981
(32)Sri Lanka	Accession	26 November 1981	26 February 1982
(33)Mauritania*	Accession	13 January 1983	13 April 1983
(34)Sudan	Accession	16 January 1984	16 April 1984
(35)Bulgaria	Accession	21 February 1984	21 May 1984
(36)Republic of Korea (South Korea)	Accession	10 May 1984	10 August 1984
(37)Mali*	Accession	19 July 1984	19 October 1984
(38)Barbados	Accession	12 December 1984	12 March 1985
(39)Italy**	Ratification	28 December 1984	28 March 1985
(40)Benin*	Accession	26 November 1986	26 February 1987
(41)Burkina Faso*	Accession	21 December 1988	21 March 1989
(42)Spain**	Accession	16 August 1989	16 November 1989
(43)Canada	Ratification	02 October 1989	02 January 1990
(44)Greece**	Accession	09 July 1990	09 October 1990

*Members of African Intellectual Propety Organization (OAPI) regional patent system. Only regional patent protection is available for OAPI countries. A designation of any country is an indication that all OAPI countries have been designated. Only one designation fee is due regardless of the number of OAPI countries designated.

**Member of European Patent Convention (EPC) regional patent system. Either national or European patents for member countries are available through PCT, except for France, Belgium and Italy, for which only European patents are available if PCT is used. Note: Only one PCT designation fee is due if European regional patent protection is sought for one, several or all EPC member countries under the PCT.

August 16, 1990

HARRY F. MANBECK, JR
Assistant Commissioner and Commissioner of Patents and Trademarks

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on September 8, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,691,387 through 4,692,945
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on September 6, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,402,091 through 4,403,352
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 1, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,336,629	06/226,418	6/29/82
4,336,630	06/234,246	6/29/82
4,336,668	06/229,545	6/29/82
4,336,669	06/219,844	6/29/82
4,336,769	06/249,565	6/29/82
4,336,837	06/233,365	6/29/82
4,336,838	06/275,399	6/29/82
4,336,877	06/233,150	6/29/82
4,336,902	06/282,403	6/29/82
4,336,916	06/259,989	6/29/82
4,336,932	06/226,673	6/29/82
4,337,000	06/270,401	6/29/82
4,337,019	06/243,667	6/29/82
4,337,032	06/229,252	6/29/82
4,337,037	06/256,961	6/29/82
4,337,049	06/223,847	6/29/82
4,337,060	06/275,108	6/29/82
4,337,073	06/221,486	6/29/82
4,337,082	06/233,178	6/29/82
4,337,124	06/292,976	6/29/82
4,337,138	06/242,028	6/29/82
4,337,184	06/220,617	6/29/82
4,337,187	06/220,955	6/29/82
4,337,206	06/258,730	6/29/82
4,337,212	06/305,470	6/29/82
4,337,223	06/212,972	6/29/82
4,337,224	06/237,211	6/29/82
4,337,253	06/243,472	6/29/82
4,337,265	06/295,178	6/29/82
4,337,286	06/225,612	6/29/82
4,337,304	06/234,983	6/29/82
4,337,332	06/252,294	6/29/82
4,337,334	06/233,225	6/29/82
4,337,354	06/236,079	6/29/82
4,337,402	06/254,021	6/29/82
4,337,447	06/242,853	6/29/82
4,957,116	06/578,671	7/01/86
4,597,117	06/689,298	7/01/86
4,597,119	06/682,253	7/01/86
4,597,124	06/686,419	7/01/86
4,597,125	06/732,469	7/01/86

Patent Number	Serial Number	Issue Date
4,597,129	06/684,713	7/01/86
4,597,135	06/582,011	7/01/86
4,597,137	06/649,749	7/01/86
4,597,144	06/756,965	7/01/86
4,597,152	06/653,181	7/01/86
4,597,154	06/591,506	7/01/86
4,597,178	06/617,757	7/01/86
4,597,179	06/703,040	7/01/86
4,597,182	06/714,926	7/01/86
4,597,186	06/764,609	7/01/86
4,597,189	06/556,574	7/01/86
4,597,191	06/659,177	7/01/86
4,597,197	06/762,243	7/01/86
4,597,201	06/721,049	7/01/86
4,597,203	06/764,712	7/01/86
4,597,211	06/523,331	7/01/86
4,597,214	06/669,296	7/01/86
4,597,215	06/613,298	7/01/86
4,597,222	06/655,503	7/01/86
4,597,230	06/603,307	7/01/86
4,597,231	06/663,409	7/01/86
4,597,237	06/569,592	7/01/86
4,597,239	06/659,256	7/01/86
4,597,270	06/665,544	7/01/86
4,597,272	06/563,200	7/01/86
4,597,273	06/609,850	7/01/86
4,597,277	06/653,562	7/01/86
4,597,281	06/653,122	7/01/86
4,597,289	06/749,247	7/01/86
4,597,296	06/649,318	7/01/86
4,597,299	06/709,233	7/01/86
4,597,302	06/311,733	7/01/86
4,597,313	06/523,937	7/01/86
4,597,317	06/565,466	7/01/86
4,597,322	06/662,967	7/01/86
4,597,335	06/563,993	7/01/86
4,597,336	06/558,008	7/01/86
4,597,337	06/614,741	7/01/86
4,597,349	06/504,962	7/01/86
4,597,352	06/526,537	7/01/86
4,597,359	06/691,395	7/01/86
4,597,363	06/472,987	7/01/86
4,597,366	06/758,317	7/01/86
4,597,383	06/727,400	7/01/86
4,597,386	06/581,710	7/01/86
4,597,387	06/544,987	7/01/86
4,597,388	06/561,894	7/01/86
4,597,395	06/768,704	7/01/86
4,597,397	06/663,199	7/01/86
4,597,398	06/702,246	7/01/86
4,597,408	06/746,746	7/01/86
4,597,414	06/738,768	7/01/86
4,597,423	06/716,106	7/01/86
4,597,429	06/681,239	7/01/86
4,597,430	06/576,906	7/01/86
4,597,437	06/600,540	7/01/86
4,597,438	06/537,870	7/01/86
4,597,443	06/551,435	7/01/86
4,597,449	06/602,547	7/01/86
4,597,454	06/619,866	7/01/86
4,597,469	06/714,487	7/01/86
4,597,474	06/518,420	7/01/86
4,597,477	06/601,039	7/01/86
4,597,480	06/685,471	7/01/86
4,597,485	06/637,901	7/01/86
4,597,490	06/699,616	7/01/86
4,597,491	06/597,141	7/01/86
4,597,495	06/727,352	7/01/86
4,597,497	06/331,151	7/01/86
5,597,500	06/705,664	7/01/86
4,597,502	06/636,798	7/01/86
4,597,520	06/647,820	7/01/86
4,597,521	06/703,580	7/01/86
4,597,524	06/705,042	7/01/86
4,597,539	06/752,984	7/01/86
4,597,542	06/756,736	7/01/86
4,597,549	06/655,521	7/01/86
4,597,550	06/738,246	7/01/86
4,597,553	06/695,090	7/01/86
4,597,561	06/510,189	7/01/86
4,597,563	06/649,593	7/01/86
4,597,568	06/603,489	7/01/86
4,597,569	06/688,011	7/01/86
4,597,572	06/649,381	7/01/86
4,597,573	06/699,277	7/01/86
4,597,575	06/283,225	7/01/86
4,597,576	06/628,993	7/01/86
4,597,579	06/729,187	7/01/86
4,597,580	06/432,969	7/01/86
4,597,585	06/673,363	7/01/86
4,597,589	06/590,148	7/01/86
4,597,590	06/689,061	7/01/86
4,597,595	06/705,778	7/01/86
4,597,597	06/475,317	7/01/86
4,597,602	06/707,814	7/01/86
4,597,603	06/730,817	7/01/86
4,597,604	06/567,231	7/01/86
4,597,605	06/667,961	7/01/86
4,597,608	06/762,436	7/01/86
4,597,609	06/680,622	7/01/86
4,597,624	06/717,507	7/01/86
4,597,626	06/654,887	7/01/86
4,597,628	06/778,446	7/01/86
4,597,645	06/353,958	7/01/86
4,597,655	06/730,062	7/01/86
4,597,656	06/655,028	7/01/86
4,597,682	06/670,987	7/01/86
4,597,684	06/623,320	7/01/86
4,597,689	06/647,720	7/01/86
4,597,694	06/604,465	7/01/86
4,597,698	06/612,479	7/01/86
4,597,703	06/619,222	7/01/86
4,597,705	06/623,383	7/01/86
4,597,716	06/623,577	7/01/86
4,597,720	06/287,060	7/01/86
4,597,722	06/715,228	7/01/86
4,597,736	06/729,911	7/01/86
4,597,739	06/736,362	7/01/86
4,597,743	06/724,776	7/01/86
4,597,744	06/579,144	7/01/86
4,597,749	06/748,699	7/01/86
4,597,751	06/648,746	7/01/86
4,597,757	06/757,381	7/01/86
4,597,762	06/319,882	7/01/86
4,597,767	06/438,571	7/01/86
4,597,769	06/710,220	7/01/86
4,597,780	06/365,429	7/01/86
4,597,781	06/673,725	7/01/86
4,597,784	06/697,328	7/01/86
4,597,798	06/686,376	7/01/86
4,597,802	06/598,917	7/01/86
4,597,811	06/751,702	7/01/86
4,597,815	06/325,054	7/01/86
4,597,817	06/655,430	7/01/86
4,597,828	06/715,618	7/01/86
4,597,840	06/705,415	7/01/86
4,597,857	06/721,022	7/01/86
4,597,860	06/730,950	7/01/86

Patent Number	Serial Number	Issue Date
4,597,867	06/705,355	7/01/86
4,597,876	06/522,637	7/01/86
4,597,899	06/737,058	7/01/86
4,597,900	06/525,356	7/01/86
4,597,923	06/645,342	7/01/86
4,597,924	06/789,598	7/01/86
4,597,940	06/698,411	7/01/86
4,597,947	06/703,978	7/01/86
4,597,973	06/761,873	7/01/86
4,597,977	06/742,551	7/01/86
4,597,981	06/742,540	7/01/86
4,597,987	06/622,342	7/01/86
4,597,998	06/670,648	7/01/86
4,598,002	06/604,961	7/01/86
4,598,041	06/687,285	7/01/86
4,598,047	06/624,285	7/01/86
4,598,065	06/279,153	7/01/86
4,598,070	06/631,997	7/01/86
4,598,073	06/518,672	7/01/86
4,598,074	06/490,441	7/01/86
4,598,076	06/691,026	7/01/86
4,598,083	06/623,133	7/01/86
4,598,086	06/639,323	7/01/86
4,598,092	06/553,049	7/01/86
4,598,093	06/609,083	7/01/86
4,598,097	06/622,590	7/01/86
4,598,151	06/441,982	7/01/86
4,598,157	06/716,924	7/01/86
4,598,175	06/555,624	7/01/86
4,598,176	06/619,042	7/01/86
4,598,177	06/692,068	7/01/86
4,598,178	06/562,281	7/01/86
4,598,193	06/615,921	7/01/86
4,598,194	06/754,689	7/01/86
4,598,210	06/609,318	7/01/86
4,598,213	06/653,613	7/01/86
4,598,223	06/685,120	7/01/86
4,598,226	06/682,215	7/01/86
4,598,229	06/633,477	7/01/86
4,598,246	06/416,005	7/01/86
4,598,260	06/601,430	7/01/86
4,598,271	06/582,018	7/01/86
4,598,279	06/541,686	7/01/86
4,598,280	06/642,302	7/01/86
4,598,288	06/563,878	7/01/86
4,598,289	06/510,092	7/01/86
4,598,291	06/607,380	7/01/86
4,598,293	06/737,905	7/01/86
4,598,297	06/544,285	7/01/86
4,598,299	06/550,289	7/01/86
4,598,312	06/593,975	7/01/86
4,598,314	06/576,613	7/01/86
4,598,325	06/738,862	7/01/86
4,598,326	06/542,943	7/01/86
4,598,329	06/476,062	7/01/86
4,598,334	06/699,377	7/01/86
4,598,336	06/538,750	7/01/86
4,598,338	06/564,107	7/01/86
4,598,341	06/723,892	7/01/86
4,598,345	06/741,947	7/01/86
4,598,352	06/605,710	7/01/86
4,598,353	06/669,143	7/01/86
4,598,374	06/535,485	7/01/86
4,598,386	06/601,510	7/01/86
4,598,401	06/606,746	7/01/86
4,598,409	06/583,026	7/01/86
4,598,411	06/631,660	7/01/86
4,598,419	06/418,359	7/01/86
4,598,420	06/559,406	7/01/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,514,949	06/492,132	5/07/85	5/06/83	3/23/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,751,895, Re. S. N. 07/539,785, Filed June 18, 1990, Cl. 118/128, DOOR CLOSURE APPARATUS FOR ENCAPSULATING A WAFER PADDLE, Cleon R. Yates, Owner of Record: *Inventor*, Attorney or Agent: Hugh D. Jaeger, Ex. Gp.: 152

4,760,025, Re. S. N. 07/556,918, Filed July 20, 1990, Cl. 435/222, MODIFIED ENZUMES AND METHODS FOR MAKING SAME, David A. Estelle, et al., Owner of Record: *Genecor, Inc., South San Fransisco, Calif.*, Attorney or Agent: James G. Passe, Ex. Gp.: 185

4,760,906, Re. S. N. 07/559,686, Filed July 30, 1990, Cl. 192/70.25, INTERNAL ASSISTED CLUTCH, Richard A. Flowtow, et al., Owner of Record: *Dana Corp., Toledo, Ohio*, Attorney or Agent: Richard S. Mac Millian, Ex. Gp.: 352

4,803,488, Re. S. N. 07/552,555, Filed July 16, 1990, Cl. 340/904, DRIVER ALERTING DEVICE, Anthony E. Dombrowski, Owner of Record: *Bruce Schreiner, Grand Island, Nebr.*, Attorney or Agent: Alan Holler, Ex. Gp.: 268

4,809,659, Re. S. N. 07/559,060, Filed July 30, 1990, Cl. 123/399, MOTORDRIVEN THROTTLE VALVE ASSEMBLY, Sigeo Tamaki, et al, Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 342

4,839,079, Re. S. N. 07/547,772, Filed July 3, 1990, Cl. 252/104, HYPOCHLORITE: TERTIARY ALCOHOL DISINFEC-

TANTS WITH REDUCED OFFENSIVE ODOR, Mark A. Wainberg, et al., Owner of Record: *Kam Sceintific Inc., Winnipeg, Canada*, Attorney or Agent: Dianne E. Reed, Ex. Gp.: 115

4,848,556, Re. S. N. 07/514,507, Filed April 25, 1990, Cl. 194/212, LOW POWER COIN DISCRIMINATION APPARATUS, Govind Shah, et al., Owner of Record: *Inventor*, Attorney or Agent: James P. Ryther, Ex. Gp.: 317

4,874,259, Re. S. N. 07/561,729, Filed Aug. 1, 1990, Cl. 384/445, BEARING DEVICE ASSEMBLY, Isao Sato, et al., Owner of Record: *Nippon Seiko Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Julia F. Church, Ex. Gp.: 245

4,875,813, Re. S. N. 07/529,891, Filed May 29, 1990, Cl. 410/9, WHEEL CHOCK, Donald L. Moyer, et al., Owner of Record: *Inventor*, Attorney or Agent: John A. Beehner, Ex. Gp.: 317

4,880,487, Re. S. N. 07/558,954, Filed July 27, 1990, Cl. 156/327, HOT MELT ADHESIVES CONTAINING POLY (P-HYDROXYSTRYRENE) HOMOPOLYMERS AND COPOLYMERS AND COPOLYMERS AND BONDING METHODS EMPLOYING SAME, Michael T. Sheenen, et al., Owner of Record: *Hoechst Celanese Corp., Somerville, N.J.*, Attorney or Agent: Richard S. Roberts, Ex. Gp.: 131

4,891,530, Re. S. N. 07/467,605, Filed Jan. 19, 1990, Cl. 250/572, TESTING OR INSPECTING APPARATUS AND METHOD FOR DETECTING DIFFERENTLY SHAPED SURACES OF OBJECTS, Guenter H. Hatji, Owner of Record: *Inventor*, Attorney or Agent: Leo Stranger, Ex. Gp.: 255

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

3,713,100, Reexam. No. 90/002,099, Requested July 31, 1990, Cl. 382/34, METHOD AND APPARATUS FOR IDENTIFYING LETTERS, CHARACTERS, SYMBOLS AND THE LIKE, Harold S. Hemstreet, Owner of Record: *Inventor, Wilton, Conn.*, Attorney or Agent: Edward Manzo, Ex. Gp.: 260, Requester: Davis, Hoxie, Faithful & Hapgood, New York, N. Y.

4,697,972, Reexam. No. 90/002,098, Requested July 30, 1990, Cl. 413/6, METHOD FOR SEAMING END CLOSURES TO A CONTAINER BODY, Lucien F. LeBret, et al., Owner of Record: *Gallay S.A., Paris, France*, Attorney or Agent: Cooper & Dunham, Ex. Gp.: 320, Requester: Kane, Dalsimer, Sullivan, Kuracz, et al., New York, N.Y.

4,720,292, Reexam. No. 90/002,095, Requested July 23, 1990, Cl. 55/337, CYLINDRICAL AIR FILTER WITH LIGHTWEIGHT HOUSING AND RADICALLY DIRECTED SEAL, Donald F. Engel, et al., Owner of Record: *Donaldson Co., Inc., Bloomington, Minn.*, Attorney or Agent: Merchant, Gould, Smith, Edell, Welter, et al., Ex. Gp.: 130, Requester: Owner

4,727,470, Reexam. No. 90/002,097, Requested July 27, 1990, Cl. 363/132, RESONANT INVERTER HAVING CREST FACTOR CONTROL, Ole K. Nilssen, Owner of Record: *Inventor, Barrington, Ill.*, Attorney or Agent: None, Ex. Gp.: 210, Requester: Paul F. Willie, Phoenix, Ariz.

4,763,099, Reexam. No. 90/002,096, Requested July 27, 1990, Cl. 338/22R, TEMPERATURE SENSITIVE DEVICE, Simon N. Balderson, Owner of Record: *Thorn EMI Plc., London, England*, Attorney or Agent: Fleit, Jacobson, Cohn, Price, et al., Ex. Gp.: 210, Requester: Owner

4,780,009, Reexam. No. 90/002,094, Requested July 25, 1990, Cl. 400/118, STEAM GENERATOR TUBE SHEET AUTOMATIC STAMPING DEVICE, David L. Crick, Owner of Record: *Combustion Engineering, Windsor, Conn.*, Attorney or Agent: Chilton, Alix & Van Kirk, Ex. Gp.: 330, Requester: Owner

4,916,004, Reexam. No. 90/002,100, Requested Aug. 1, 1990, Cl. 428/192, CEMENT BOARD HAVING REINFORCED EDGES, Robert P. Ensminger, et al., Owner of Record: *US Gypsum Co., Chicago, Ill.*, Attorney or Agent: Kirk M. Dikrick, Ex. Gp.: 150, Requester: Owner

Interferences—Preliminary Motions for Judgment

When a party files a preliminary motion for judgment [37 CFR § 1.633(a)] against an opponent in an interference on the ground that the claim(s) corresponding to a count are unpatentable over prior art, *and*, based upon the effective filing date(s) of the application(s)/patent(s) involved in the interference, the prior art would also be applicable to the moving party, the following will apply:

1. The mere filing of the motion *will not* be construed as an admission by the moving party [*See* Commissioner's Notice of May 23, 1990, 1115 Off. Gaz. Pat. Office 31 (June 19, 1990), discussing *Winkler v. Guglielmino*, Appeal No. 89-1571 (Fed. Cir. May 9, 1990) (unpublished)].

2. The Examiner-in-Chief (EIC) will determine (i) whether the date(s) of the cited prior art are such that it would on its face appear to apply to the moving party, *and* (ii) if so, whether the motion includes an explanation as to why the prior art would not be applicable to the movant. If the motion does not contain an explanation, the EIC will send a letter to the moving party. The letter must: (a) inform the movant that the prior art appears to be applicable against the movant; (b) set a time period to provide an explanation as to why the prior art does not apply to the movant; (c) state that unless a sufficient explanation (and evidence, if appropriate, e.g., Rule 132 affidavit) is filled within the time set, the movant will not be permitted to rely on any such explanation (and evidence) in response to or in any subsequent action in the interference.

3.If the movant provides no explanation, or an insufficient explanation, as to why the cited prior art would not apply to the movant, the EIC will determine whether or not the prior art cited in support of the motion renders the count (claims corresponding to the count) unpatentabe to the moving party as well as each of the other parties. If the EIC concludes that the claims are unpatentable, the EIC will issue an Order to Show Cause under 37 CFR § 1.640 against *all* parties to whom the prior art is applicable without regard to the dates alleged in the preliminary statements.[1] Note that if the moving party expressly admits that the prior art renders his corresponding claims unpatentable, the EIC must still determine whether the corresponding claims of the other parties are unpatentable over that art.

4. In response to the Order to Show Cause, the parties have the options set forth in the Commissioner's Notice of December 8, 1986, 1074 Off. Gaz. Pat. Office 4 (January 6, 1987), and/or may move under 37 CFP § 1.651(c)(4) for a testimony period, if appropiate. However, the following should be noted:

A. If the party who filed the motion for judgment is under the Order to Show Cause, the party's showing and/or request for testimony in response to the Order may *not* be based upon any reasons which could have been, but were not, given in explanation of why the cited prior art would not apply to the party.

B. If the prior art is not a statutory bar to a party and the allegations in that party's preliminary statement, if proven, would antedate the effective date(s) of the prior art, an appropriate response to the Order to Show Cause would be a request to take testimony to antedate the prior art, as well as to prove priority of invention. *If applicable, this option may be specified in the Order to Show Cause.*

C. A request for a testimony period to remove the prior art based upon other reasons, e.g., inoperativeness of a reference, unexpected results, etc., must meet the criteria set forth in *Hanagan v. Kimura*, Interference No. 102,150 ___USPQ2d___ (Comm'r. Pat. Apr. 5, 1990) (LEXIS, Patcop library, Omni file).

D. Even assuming corroboration, the evidence necessary to antedate a reference is not necessarily the same as that required to prove priority of invention. *Cf. Anderson v. Norman*, 185 USPQ 371 (Comm'r Pat. 1968). Therfore, depending on the circumstances, a request to take priority testimony may not be adequate to cover taking testimony to antedate the reference, and vice versa.

August 10, 1990

SAUL SEROTA
Chairman,
Board of Patentt
Appeals and Interferences

1. Goutzoulis v. Athale, 15 USPQ2d 1461 (Comm'r Pat.) suggests that a preliminary statement might be considered to determine whether an Order to Show Cause should be issued. In view of the procedure outlined herein, that suggestion will not be followed.

Errata

"All reference to Patent No. 4,944,440 to Eugene J. Fortman of Minn. for `DISPOSABLE DENTAL FLOSS CASSETTE DISPENSER SYSTEM' appearing in the Official Gazette of July 31, 1990 should be deleted since no patent was granted."

"All reference to Patent No. D. 309,668 to Jules Schneider of N. Y. for `SHOE SOLE' appearing in the Official Gazette of August 7, 1990 should be deleted since no patent was granted."

Patents Avialable for Licensing or Sale

4,265,857 METHOD AND APPARATUS FOR MEASURING CYANIDE, Richard Lanyon, District of Greater Chicago, 100 E. Erie St., Chicago, Ill. 60611

4,744,310 BALE TIE BLANKET, Hal Whisnant, 501 Manning Dr., Charlotte, N. C. 28209

D.308,218 MUSICAL COMPOSER, Joseph R. Sinkler, Jr., C/O Waters, Morse & Harrington, P.C., 940 Calder Plaza Building, Grand Rapids, Mich. 49503

4,951,615 FOUR-STROKE OSCILLATING PISTON INTER NAL COMBUSTION ENGINE, Nikolaos S. Pahis, 8 Alpert Dr., Vernon, Conn. 06066

07/362,590 CONSUMER COLOR REFERENCE, Joseph P. Burke, 4050 Benefield Dr., Kettering, Ohio 45429

U. S. DEPARTMENT OF COMMERCE

AGENCY: Patent and Trademark Office.
ACTION: Notice.
SUMMARY: In accordance with Section 10(a)(2) of the Federal Advisory Committe Act (Public Law 92-463), announcement is made of the open metting of the Public Advisory Committee for Trademark Affairs.
DATE: The Public Advisory Committee for Trademark Affairs will meet from 10:00 a.m. until 4:00 p.m. on September 25, 1990, and from 9:30 a.m. until 12:00 p.m. on September 26, 1990.
PLACE: U. S. Patent and Trademark Office, 2121 Crystal Drive, Crystal Park 2, Room 912, Arlington, Virginia.
STATUS: The meeting will be open to public observation; seating will be available for the public on a first-come-first-served basis. Members of the public will be permitted to make oral comments of three(3) minutes each. Written comments and suggestions will be accepted before or after the meeting on any of the matters discussed. Copies of the minutes will be available upon request.
MATTERS TO BE CONSIDERED: The agenda for the first day of the meeting is as follows:

(1) Finance
(2) Automation
(3) Strategic Planning
(4) Current Trademark Office Practice Issues

The agenda for the second day of the meeting is as follows:

(1) The Federal Advisory Committee Act
(2) Ethics and Conflicts of Interest

CONTACT PERSON FOR MORE INORMATION: For further information, contact Lynn Beresford, Office of the Asssistant Commissioner for Trademarks, Room CPK2-910, Patent and Trademark Office, Washington, D.C. 20231. Telephone: (703) 557-7464.

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks

Service by Publication

A petition to cancel the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Joan E. Springle, Tallahassee, Fla., Reg. No. 973,659, for the mark "LEARNING TO READ", Canc. No. 18,603.

Roman Cheese Products Ltd., Niagara Falls, Ontario, Canada, Reg. No. 644,262, for the mark "ROMAN" and design, Canc. No. 18,740.

Hoi Trung, Inc., Los Angeles, Calif., Reg. No. 1,293,700, for the mark "HOI TRUNG", Canc. No. 18,543.

JEAN BROWN
Administrator, Trademark
Trial and Appeal Board
For JEFFERY M. SAMUELS
Assistant Commissioner
for Trademarks

PATENT NOTICES

Certificates of Correction For Week of September 11, 1990

B14,512,098	4,831,605	4,858,760	4,866,567
D. 300,452	4,833,028	4,858,777	4,866,898
Re. 32,305	4,833,221	4,859,360	4,867,609
3,781,329	4,834,798	4,859,589	4,867,888
4,313,843	4,834,920	4,859,684	4,867,975
4,383,085	4,835,194	4,859,690	4,868,167
4,444,194	4,835,316	4,859,779	4,868,467
4,451,366	4,835,618	4,860,281	4,868,495
4,702,112	4,837,052	4,860,738	4,869,458
4,716,093	4,838,165	4,860,976	4,869,594
4,716,819	4,840,240	4,861,074	4,869,600
4,721,867	4,841,952	4,861,417	4,870,309
4,748,167	4,844,445	4,861,433	4,870,532
4,750,177	4,846,596	4,861,546	4,870,638
4,757,026	4,848,823	4,861,569	4,870,667
4,761,414	4,848,905	4,861,814	4,871,013
4,761,426	4,850,581	4,861,828	4,871,178
4,763,530	4,851,527	4,861,878	4,871,256
4,773,430	4,851,707	4,861,879	4,871,307
4,775,719	4,851,903	4,861,892	4,871,808
4,780,013	4,852,084	4,861,963	4,872,066
4,785,938	4,852,809	4,862,290	4,872,089
4,791,492	4,854,302	4,862,357	4,872,151
4,792,525	4,854,387	4,862,861	4,872,912
4,803,087	4,855,187	4,862,947	4,873,591
4,804,639	4,855,202	4,863,043	4,874,016
4,806,309	4,855,762	4,864,840	4,875,015
4,806,977	4,855,765	4,865,230	4,875,026
4,808,724	4,855,777	4,865,282	4,877,290
4,817,386	4,856,053	4,865,610	4,879,745
4,818,899	4,857,350	4,865,705	4,880,450
4,820,797	4,857,400	4,865,809	4,880,650
4,821,306	4,857,758	4,865,868	4,884,671
4,824,218	4,857,821	4,866,056	4,916,013
4,830,053	4,857,909	4,866,060	4,919,528
4,830,214	4,857,914	4,866,081	4,924,238
4,830,239	4,858,721	4,866,414	4,936,587

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

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Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 200	Mail relating to PTO Bicentennial Celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box DAC	Petitions to revive, petitions to accept late payment of fees, petitions to defer issue, and petitions to withdraw an application from issue.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
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Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
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Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	Not Yet Operational
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Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director.	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	8-3-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	8-15-88
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	3-8-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	12-22-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director.	8-29-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	1-21-87
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	8-15-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

REEXAMINATIONS

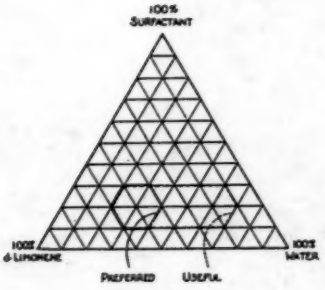
SEPTEMBER 11, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,511,488 (1350th)
D-LIMONENE BASED AQUEOUS CLEANING COMPOSITIONS

Grant B. Matta, Dover, N.J., assignor to Penetone Corp., Tenafly, N.J.

Reexamination Request No. 90/001,808, Jul. 10, 1989.
Reexamination Certificate for Patent No. 4,511,488, issued Apr. 16, 1985, Ser. No. 558,040, Dec. 5, 1983.
Int. Cl.[5] C11D *7/24, 3/18*
U.S. Cl. 252—162



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–17** is confirmed.

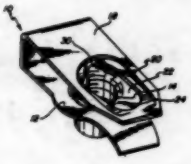
New claim **18** is added and determined to be patentable.

1. A d-limonene based liquid cleaning composition for cleaning hard or flexible substrates, said composition, per 100 parts by weight, comprising 78 to 96 parts by weight of a d-limonene/surfactant/water mixture containing by weight 10–60% stabilized d-limonene, 10–30% surfactant and 20–70% water, 2–10 parts of coupling agent, and 2–12 parts of additives adapting the composition to particular uses, said composition being characterized as being free of petroleum derived or chlorinated hydrocarbon solvents, as having a flash point not lower than 160° F. (C.O.C.), and as being a stable, flowable, clear, homogeneous liquid composition.

B1 4,729,706 (1351st)
FASTENER CLIP

Francis C. Peterson, Woodbury, and Phillip D. Becker, Southbury, both of Conn., assignors to Buell Industries, Inc., Waterbury, Conn.

Reexamination Request No. 90/001,803, Jun. 28, 1989.
Reexamination Certificate for Patent No. 4,729,706, issued Mar. 8, 1988, Ser. No. 33,175, Apr. 1, 1987.
Reexamination Certificate B0 4,729,706, issued .
Int. Cl.[5] F16B *37/02, 37/04*
U.S. Cl. 411—175



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** are cancelled.

[1. In a fastener assembly of the type where a clip having two legs is adapted to be pushed onto an edge of a sheet material, said clip having a tongue formed on a first leg for frictionally engaging said sheet material and having on a second leg an internally threaded barrel, the improvement wherein said tongue comprises: a U-shaped elongated tongue formation, with an oblong aperture therein, attached to said first leg at two points at the tips of said U-shape.**]**

B1 4,866,110 (1352nd)
THERMOPLASTIC COMPOSITIONS RESIN MOLDED PRODUCT FOR VEHICLE LINING AND METHOD FOR MANUFACTURING THE SAME

Chang Y. Lee, Busan, Rep. of Korea, assignor to Han Il E'wha, Seoul, Rep. of Korea

Reexamination Request No. 90/001,889, Nov. 9, 1989.
Reexamination Certificate for Patent No. 4,866,110, issued Sep. 12, 1989, Ser. No. 71,743, Jul. 9, 1987.
Claims priority, application Rep. of Korea, Jul. 9, 1986, 5524/1986
Int. Cl.[5] C08K *5/54, 3/34;* **C08L** *35/00*
U.S. Cl. 524—11

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–10** is confirmed.

[1. A thermoplastic composition for use in molding a vehicle lining or the like comprising a mixture of about 50 to about 60 weight percent of polypropylene, about 30 to about 35 weight percent wood flour, about 2 to about 3 weight percent defatted rice bran powder, about 2 to about 3 weight percent asbestos, about 1.7 to about 4.0 weight percent glass fiber and about 0.8 to about 1.2 weight percent calcined diatomaceous earth.**]**

REISSUES

SEPTEMBER 11, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,326

SEMICONDUCTOR VAPOR PHASE GROWING APPARATUS

Hitoshi Ebata, Mishima, and Shigetagu Matunaga, Gotenba, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

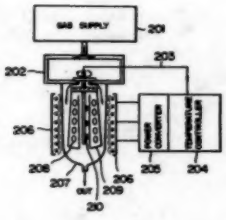
Original No. 4,430,959, dated Feb. 14, 1984, Ser. No. 461,231, Jan. 26, 1983. Application for reissue Jun. 9, 1988, Ser. No. 204,364

Claims priority, application Japan, Jan. 28, 1982, 57-11997

Int. Cl.[5] B05C *11/00*

U.S. Cl. 118—697

11 Claims



12. Semiconductor vapor growing apparatus comprising:

a reaction furnace for vapor phase growing a semiconductor on a semiconductor substrate;

heating means for heating said substrate;

sources of various gases necessary for vapor phase growth;

a pipeline network for interconnecting said reaction furnace and said source;

valve means connected to said pipeline network for supplying predetermined quantities of said gases to said reaction furnace; and

control means for supplying control signals to said valve means and said heating means,

said control means including:

at least one process program group, each said process program group comprising a plurality of process programs individually defining a series of process sequences of the process program group and constituting one complete cycle of vapor growth in said reaction furnace.

a first memory means for storing the at least one process program group and having a memory region for storing process parameter information regarding the time and temperature in said reaction furnace, at least one gas used in said process sequence, and the flow rates thereof.

key input means,

display means for displaying in response to said key input means the contents of each of said process program,

a system program comprising an instruction decoding program for decoding said process programs for producing said control signals and an instruction modifying program for modifying a process sequence defined by a particular process program in response to input signals from said key input means and

a second memory means for storing the system program.

Re. 33,327

MELT OVERFLOW SYSTEM FOR PRODUCING FILAMENTARY AND FILM PRODUCTS DIRECTLY FROM MOLTEN MATERIALS

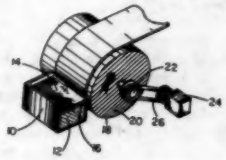
Lloyd E. Hackman, Worthington, Ohio; James Dickson, Stirling, N.J.; David L. Dunlap, Gahanna, and Mark E. Handshey, Columbus, both of Ohio, assignors to Ribbon Technology Corporation, Ghanna, Ohio

Original No. 4,813,472, dated Mar. 21, 1989, Ser. No. 89,544, Aug. 26, 1987. Continuation-in-part of Ser. No. 819,474, Jan. 16, 1986, abandoned, which is a continuation of Ser. No. 561,309, Dec. 14, 1983, abandoned. Application for reissue Sep. 13, 1989, Ser. No. 406,590

Int. Cl.[5] B22D *11/06*

U.S. Cl. 164—463

7 Claims



1. An improved method for producing filaments from a molten material held in a receptacle, said method being the type wherein a layer of the molten material is solidified on a heat extracting substrate by moving a surface of the substrate past a region of contact with the molten material, cooling the molten material and removing it from the substrate, wherein the improvement comprises:

(a) forming adjacent helical ridges surrounding the outer surface of a symmetrical, heat extracting substrate;

(b) forming an opening through a side wall of the receptacle, the opening extending from above the level of the free surface of the molten material in the receptacle downwardly to a lower edge at the bottom of the opening;

(c) positioning the heat extracting substrate laterally disposed of the receptacle and adjacent the edge;

(d) raising the level of the free surface of the molten material in the receptacle above the edge of said opening to cause the molten material to overflow over said edge and against the substrate to form a melt front at the interface of the molten material and the substrate, the level of the free surface being maintained sufficiently above the edge that the melt front interfacing against the substrate extends downwardly from the free surface of the molten material farther than the root depth of the ridges on the substrate and sufficiently far that the molten material cannot form and hold a meniscus by surface tension between the edge and the level of the free surface, but instead is confined by the substrate; the height of the molten material overflow being greater than the height of the molten material which can be maintained at the lip by surface tension so that the molten material would flow into the root of the ridges if the substrate were stationary; and

(e) rotating the substrate to move the substrate surface past the melt front and migrating the helical ridges substantially horizontally across the melt front to prevent the molten material from filling into the bottom of the valleys between the helical ridges, the migration being effected by the rotating of the substrate and the resulting wave like migration of the ridges along the edge.

3. An apparatus for producing filament or fiber from a molten material, the apparatus comprising:

(a) a receptacle for containing a pool of molten material at a selected horizontal level for the free surface of the pool, the receptacle having an opening extending from above the free surface level to a bottom edge of the opening, the bottom edge being sufficiently below the free surface level that the molten material cannot form and hold a meniscus by surface tension between the edge and the level of the free surface;

(b) a heat extracting substrate laterally disposed with respect to the receptacle, the substrate having adjacent helical ridges which have a pitch ranging from about two times as many ridges per longitudinal inch than is possible with ridges in melt extraction to a pitch of about 40 ridges per inch, the ridges formed about a generally horizontal axis on the outer surface of a symmetrical, heat extracting substrate which is positioned adjacent the edge and the opening for confining the molten material and preventing it from overflowing downwardly out of the receptacle, the substrate also spaced from the edge and mounted to be contacted by the overflowed molten material substantially at the level of the upper surface of the molten material, the positioning of the substrate relative to the edge further being sufficiently high to make fiber and filaments and not ribbon or sheet; and

(c) drive means drivingly connected to the substrate for continuously moving the surface of the substrate upwardly past the edge and past a melt front formed at the interface of the molten material and the substrate surface, and for moving the helical ridges in a substantially horizontal migration along the edge to prevent the molten material from filling into the bottom of the valleys between the helical ridges, the migration being effected by the rotation of the substrate and the resulting wave-like migration of the ridges along the edge.

Re. 33,328

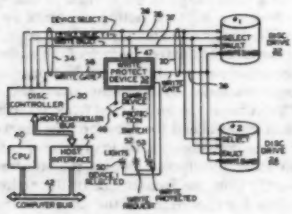
WRITE PROTECT CONTROL CIRCUIT FOR COMPUTER HARD DISC SYSTEMS

Dennis Director, 2720 Hawthorne La., Wilmette, Ill. 60091

Original No. 4,734,851, dated Mar. 29, 1988, Ser. No. 723,880, Apr. 17, 1985. Application for reissue Feb. 2, 1989, Ser. No. 305,851

Int. Cl.[5] G06F *13/12*

U.S. Cl. 364—200 **3 Claims**



1. A write protect system comprising:

a computer having at least one memory means, said memory means including a hard disc drive,

a controller coupled to said hard disc drive by at least one information transfer bus and at least one control data bus,

means for selecting said hard disc drive for operation by sending a signal from said controller to said hard disc drive on a first wire in said control data bus,

means for enabling said hard disc drive to erase data in said hard disc drive by sending a signal from said controller to said hard disc drive on a second wire in said control data bus,

circuit means coupled to said control data bus for monitoring signals transmitted on said first wire in said control data bus,

guard means for selectively interrupting the signal from said enabling means on the second wire to prevent said hard [disk] *disc* drive from being enabled to erase data thereby preventing data from being [accidentially] *accidentally* erased from said hard disc [drive] *drives*,

said guard means including a plurality of logic devices, at least one of said logic devices having an output coupled to said hard disc drive and at least one of said logic devices having an input coupled to said enabling means by connection to said second wire, and a manual switch coupled to said logic devices for controlling the logic states of said logic devices to enable gating of the signal from the enabling means responsive to the manual switch,

whereby data cannot be erased from said hard disc drive when said manual switch is in a selected write protect state.

Re. 33,329

AUTOMATIC FEEDING DEVICE FOR COPYING MACHINES

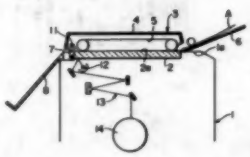
Shoichi Ishii, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Original No. 4,334,674, dated Jun. 15, 1982, Ser. No. 181,557, Aug. 27, 1980. Application for reissue Feb. 21, 1984, Ser. No. 525,775

Claims priority, application Japan, Sep. 11, 1979, 54-115721

Int. Cl.[3] B65H *9/04*

U.S. Cl. 271—245 **14 Claims**



1. A registration device for an automatic feeding device for original documents comprising: an elongated registration member disposed adjacent one edge of a platen member for supporting an original document in a copying position, a leading edge of said original document abutting an upper portion of said registration member in said copying position, said registration member comprising a permanent magnet extending substantially the length thereof; guide means disposed along at least one edge of said registration member wherein said registration member is movable between an upper position with said upper portion extending above the upper edge of said platen and a lower position below said upper surface of said platen; spring means for biasing said registration member toward said upper position; cover means disposed above said platen and registration member; and electromagnet means, said electromagnet means extending substantially the length of said registration member, said electromagnet means producing a magnetic field in response to an exciting signal applied thereto for urging said registration member to move to a position below said upper surface of said platen.

5. A registration device for an automatic feeding device for original documents comprising: a registration member disposed adjacent one edge of a platen member for registering an original document in a copying position with an edge of an original document abutting an upper portion of said registration member, wherein said registration member is movable between an upper position with said upper portion extending above the upper surface of said platen and a lower position not extending above said upper surface of said platen; biasing means for biasing said registration member toward said upper position; cover means disposable above said platen and said registration member; and magnetic means in said cover means for urging said registration member into said lower position.

Re. 33,330

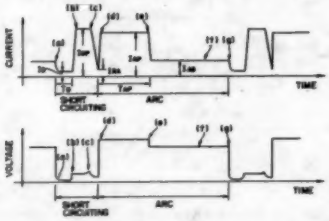
OUTPUT CONTROL OF SHORT CIRCUIT WELDING POWER SOURCE

Takaaki Ogasawara; Tokuji Maruyama, both of Yokohama; Masaharu Sato, Kanagawa; Yukio Hida, Kanagawa, and Takashi Saito, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Original No. 4,546,234, dated Oct. 8, 1985, Ser. No. 596,686, Apr. 4, 1984. Application for reissue Aug. 13, 1986, Ser. No. 896,104

Int. Cl.[5] **B23K** *9/09*

U.S. Cl. 219—137 PS **14 Claims**



1. A method for controlling the output of a power source in consumable electrode arc welding in which a short circuiting phase and an arcing phase alternately take place between a consumable electrode and a workpiece in a shielding gas atmosphere, which comprises:

a first stage of maintaining the output welding current at a first value at a relatively low level upon establishment of a short circuit across a gap between said consumable electrode and said workpiece;

a second stage of maintaining the welding current at a second value at a relatively high level subsequent to the first stage;

a third stage of lowering the welding current to a third value at a low level upon detection of necking as a premonition of rupture of short circuiting molten metal between said electrode and said workpiece;

a fourth stage of, upon generation of an arc across said gap between said electrode and workpiece subsequent to the third stage, maintaining the welding current at a fourth value at a relatively high level exceeding the value of average welding current and controlling the [duration] *value* of said high level current as a function of the feed rate of said consumable electrode; and

a fifth stage of maintaining the welding current at a fifth value at a relatively low level until said gap between said electrode and workpiece is short-circuited, under control of substantially constant current characteristics so as to feed current of a constant level irrespective of variations in arc length.

Re. 33,331

MULTIPLEXER CIRCUITRY FOR HIGH DENSITY ANALOG SIGNALS

Randolph S. Carlson, Carson City, Nev., assignor to Irvine Sensors Corporation, Costa Mesa, Calif.

Original No. 4,490,626, dated Dec. 25, 1984, Ser. No. 403,004, Jul. 29, 1982. Application for reissue Apr. 10, 1989, Ser. No. 336,017

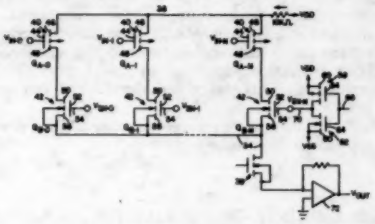
Int. Cl.[5] **H03K** *17/687*

U.S. Cl. 307—243 **20 Claims**

1. A multiplexer, for use with an array of independent analog voltage signal sources, comprising:

a plurality of separate signal-carrying branches, each having an input from a different analog voltage signal source, and all connected to a common output line *which carries multiplexed current signals*, said branches being coupled in parallel between a reference terminal and the common output line;

each branch including an amplifier which causes a high power gain of its analog voltage input when enabled, but which has substantially no power dissipation when disabled, and a respective actuating means for enabling or disabling the individual branch;



the amplifier in each branch being an insulated gate field effect transistor which receives the voltage input signal on its gate and outputs an analog signal as its source-to-drain current when its respective branch is enabled by its actuating means; and

sequencing means for causing each actuating means to enable its respective branch only when all the others in the multiplexer are disabled.

Re. 33,332

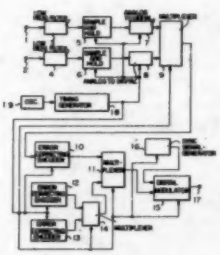
APPARATUS FOR CORRECTING ERRORS

Tsuneo Furuya, Yokohama, and Katsuya Hori, Kawasaki, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Original No. 4,644,544, dated Feb. 17, 1987, Ser. No. 672,267, Mar. 12, 1984. Application for reissue Nov. 14, 1988, Ser. No. 270,051

Int. Cl.[5] **G06F** *11/10*

U.S. Cl. 371—37.4 **8 Claims**



1. An apparatus for correcting errors in data which has, as a unit, (n+k+m+l) symbols subjected to processing for error correction coding when data consisting of n symbols and m symbols having different kinds of information and 1 parity symbols is transmitted as a unit, said processing consisting of

an encoding process with respect to a first error detection code or an error correction code for generating a redundancy code of k symbols regarding said n symbols, and

an encoding process with respect to a second error correction code for generating a redundancy code of [one symbol] *l symbols* regarding (n+k+m) symbols, wherein said error correcting apparatus comprising:

a first decoder with respect to said first error detection code or said error correction code to which said redundancy code of (n+k) symbols is supplied and which generates a first flag signal indicative of the error state by at least

performing the error detection wherein said first flag signal is the signal indicating the number (including 0) of error symbols with respect to the (n+k) symbols; and

a second [decorder] *decoder* with respect to said second error correction code to which (n+k) symbols corrected by said first decoder and (m+1) symbols received are supplied and which generates a second flag signal representing the error state by performing the error detection, wherein said second flag signal is the signal representing the number (including 0) of error symbols before the error correction by said second decoder with respect to the (n+k+m+l) symbols, and performs the error correction by comparing said first and second flag signals and the error correction processing by said second decoder is controlled in accordance with the result of said comparison.

6. An error correcting apparatus according to claim 1, wherein 1 equals four parity symbols.

Re. 33,333

DIGITAL AUDIO AMPLIFIER HAVING A HIGH POWER OUTPUT LEVEL AND LOW DISTORTION

Wilson E. Taylor, Jr., and Larry E. Hand, both of Meridian, Miss., assignors to Peavey Electronics Corporation, Meridian, Miss.

Original No. 4,600,891, dated Jul. 15, 1986, Ser. No. 643,315, Aug. 21, 1984. Application for reissue Mar. 11, 1988, Ser. No. 211,217

Int. Cl.[5] **H03F** *3/38*

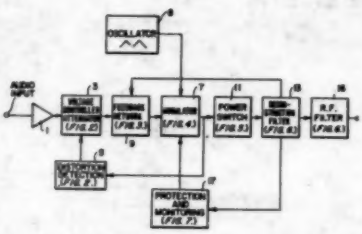
U.S. Cl. 330—10 **41 Claims**

36. A digital energy conversion audio amplifier, comprising:

a feedback network responsive to an analog signal to be amplified;

a modulator responsive to said analog signal for converting said analog signals to pulse width-modulated trains of pulses and including first and second switching devices coupled together in a non-saturating common terminal differential amplifier configuration and responsive to said analog signals and a serrated waveform controlling the pulse width modulation of said analog signals, and power amplifier means for amplifying said pulse width-modulated trains of pulses;

reconstruction filter means responsive to the amplified trains of pulses for recovering the analog signals;



means for coupling a signal from said reconstruction filter means to said feedback network to eliminate closed loop distortion; and

further comprising voltage controlled attenuator means responsive to an analog signal to be amplified and proving an analog output representative thereof and distortion detection means responsive to the pulse width-modulated trains of pulses to detect pulses missing therefrom and controlling said voltage controlled attenuator to attenuate the analog signal to be amplified.

PLANT PATENTS

GRANTED SEPTEMBER 11, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,319

ROSE PLANT MACMINMO

Sam McGredy, Auckland, New Zealand, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Feb. 17, 1989, Ser. No. 312,963
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—1 1 Claim

1. A new and distinct variety of rose plant of the Shrub class substantially as herein shown and described, characterized particularly as to novelty by the unique combination of red and white striped flowers, glossy green foliage, arching habit of growth and above average disease resistance.

7,320

CHERRY TREE 'CRAIG'S CRIMSON'

Chris F. Zaiger, 537 Rosemore Ave.; Leith M. Gardner, 1207 Grimes Ave.; Gary N. Zaiger, 1907 Elm Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351

Filed Aug. 28, 1989, Ser. No. 401,661
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—37 1 Claim

1. A new and distinct variety of cherry tree, substantially as illustrated and described, characterized by its semi-dwarf size, 10 to 14 feet at maturity, its semi-spreading growth, self fertility and being a regular and productive bearer of medium to large size fruit with an attractive dark red skin color and having good flavor and eating quality.

7,321

VARIETY OF GERANIUM NAMED GRACE

Douglas Holden, Solvang, Calif., assignor to Bodger Seeds, Ltd., El Monte, Calif.

Filed Apr. 28, 1989, Ser. No. 345,626
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of Geranium plant substantially as herein shown and described and characterized by lateral and procumbent mound and cascading growth habit, compactness, the presence of zoning, the pale pink inflorescence, the use of either hanging basket or ground bed, its heat tolerance, and a much better cutting producer when compared with available ivy geranium varieties.

7,322

VARIETY OF GERANIUM NAMED JUDY

Douglas Holden, Solvang, Calif., assignor to Bodger Seeds, Ltd., El Monte, Calif.

Filed Apr. 28, 1989, Ser. No. 346,136
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant substantially as herein shown and described and characterized by its floriferousness, light salmon color, compact habit, lateral and procumbent growth habit, heat tolerance, better cutting producer when compared to other ivy Geranium varieties, full growth and dark zoning.

7,323

AFRICAN VIOLET PLANT NAMED LITTLE MOONSTONE

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,465
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Little Moonstone, as described and illustrated, and particularly characterized by its miniature growth habit; double white flowers with light blue touch in the center, strong stems which curve toward the center to form a compact bouquet above the leaves; profuse and continuous flowering; bright green, serrated, round leaves; flowering 10–11 weeks after planting of unrooted shoot, and by its long lasting and non-dropping flowers.

7,324

CHRYSANTHEMUM PLANT NAMED ORINDA

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Apr. 13, 1989, Ser. No. 337,463
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct Chrysanthemum plant named Orinda, as described and illustrated.

7,325

CHRYSANTHEMUM PLANT NAMED DAVIS

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 2, 1989, Ser. No. 388,894
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct Chrysanthemum plant named Davis, as described and illustrated.

PATENTS

GRANTED SEP. 11, 1990

ERRATA

For CLASS	See PATENT NO.
024-641	4,955,115
105-004	4,955,144
132-271	4,955,145
047-025	4,955,156
312-340	4,955,160
054-079	4,955,182
060-303	4,955,183
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104-007	4,955,301
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187-009	4,955,461
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182-133	4,955,584
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015-257 4,955,925
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108-056 4,955,940
108-065 4,955,941
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123-073 4,955,943
123-041 4,955,944
128-203 4,955,945
128-719 4,955,946
128-748 4,955,947
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166-055 4,955,951
181-111 4,955,952
184-042 4,955,953
192-002 4,955,954
198-318 4,955,955
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220-324 4,955,957
244-213 4,955,958
227-178 4,955,959
239-003 4,955,960
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244-023 4,955,962
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350-523	4,955,978
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374-185	4,955,980
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528-093	4,956,411
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530-324	4,956,449
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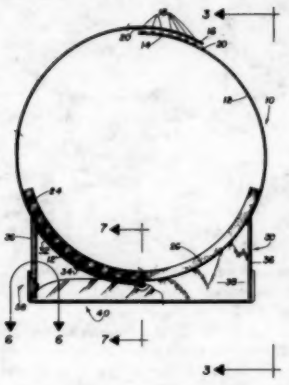
525-064	4,956,501
568-729	4,956,502
330-004	4,956,619
358-149	4,956,699
381-031	4,956,871

PATENTS

GRANTED SEPTEMBER 11, 1990

GENERAL AND MECHANICAL

4,955,087
COMBINED VISOR AND SUNGLASSES ASSEMBLY
Richard Perez, 11201 SW. 55 St., Miramar, Fla. 33025, and Jose F. Deida, 381 W. 14 St., Hialeah, Fla. 33010
Filed Sep. 15, 1988, Ser. No. 244,838
Int. Cl.[5] A61F *9/00*
U.S. Cl. 2—12 **15 Claims**

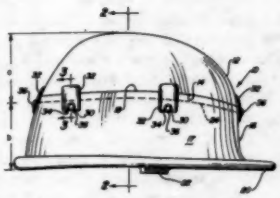


1. A combination sun visor and sunglasses assembly designed to be worn on the head of a person, said assembly comprising:
a. a mounting means structured for removable attachment in surrounding relation to a head of a wearer,
b. a bracket structure secured to a front portion of the mounting means and disposed above the eyes of the wearer,
c. a lens structure having an elongated configuration terminating at two opposite ends and formed of a darkened, transparent material and pivotally mounted on a leading portion of the bracket structure and selectively positionable between a viewing position and a shading position,
d. said viewing position defined by substantially depending, transverse relation of said lens structure to said mounting means and an overlying disposition to the eyes of the wearer, whereby the wearer views through said lens structure,
e. said shading position defined by an outwardly disposed substantially aligned and continuing extension of said lens structure with said mounting means, said shading position of said lens structure being disposed above and in shading relation to the eyes of the wearer,
f. positioning means mounted in part on both said bracket structure and said lens structure and configured to removably maintain the lens structure in either said viewing position or said shading position, and
g. said positioning means being disposed in part on each of said two opposite ends of said lens structure and in mating engagement with a remainder of said positioning means mounted on a correspondingly positioned opposite side of said bracket structure and in registry therewith.

4,955,088
UNDERWEAR STRUCTURE
John W. Terjesen, Rte. 1, Box 261A, Brevard, N.C. 28712
Filed Feb. 6, 1989, Ser. No. 306,048
Int. Cl.[5] A41B *9/02*
U.S. Cl. 2—403 **3 Claims**

1. In a man's support type undergarment having a front panel, a waistband at the top of the garment, thigh encircling leg portions at the bottom of the garment and a crotch portion between said leg portions, the improvement comprising:
a generally rectangular section of fabric stitched behind said front panel along said leg portions and across the bottom thereof above said crotch portion with a top of said rectangular section being unstitched to the undergarment and defining a ledge extending between said leg portion and above said crotch whereby the male sex organ is rested upon said ledge and generally isolated from the remaining interior of the undergarment.

4,955,089
TWO-PIECE HARD HAT
Jeremy H. Beale, 8084 Beacon La., Northville, Mich. 48167, assignor to Jeremy H. Beale, Northville, Mich.
Filed Feb. 13, 1989, Ser. No. 309,168
Int. Cl.[5] A42B *3/32*
U.S. Cl. 2—410 **3 Claims**



1. A protective hard hat assembly comprising:
an upper crown member being generally dome shaped and having a generally annular periphery;
a lower ring skirt member having a generally upright wall portion with an upper end of a shape and size corresponding to the periphery of said crown member and a lower end forming a brim; and
means for detachably securing said crown member to said skirt member with the periphery of said crown member engaging the upper end of said skirt member to form said hard hat assembly, said securing means includes coacting means on said crown member periphery and said skirt member upper end forming a tongue and groove joint between said crown member and said skirt member, said crown and skirt members secured to one another at a location approximately midway of the vertical height of said hard hat assembly such that when detached, the height of each member is approximately half the height of the assembled hard hat, and
a sealing ring disposed in the bottom of said groove and

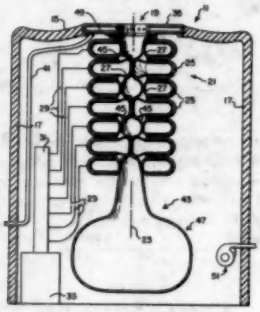
sealing the connection between said upper and lower members to prevent liquid from leaking into said hard hat.

4,955,090

ZERO GRAVITY TOILET

Alexander Stefan, 216 E. Arby Ave., Las Vegas, Nev. 89119

Filed Nov. 13, 1989, Ser. No. 436,314
Int. Cl.[5] B64D *11/02*
U.S. Cl. 4—316 10 Claims



1. Toilet for use in zero gravity conditions, comprising:

(a) a support housing including an upper wall with a central opening therein adapted to receive therethrough solid and liquid waste material;

(b) a flexible bag adapted for receiving and holding said waste material, the walls of said bag being permeable to gases and impermeable to solid and liquid waste material and having an open end that is releasably mounted about the inside periphery of said central opening, and said bag having an elongated neck portion and a lower portion adapted for receiving and collecting said waste materials;

(c) a plurality of toroidal-shaped elements in a closely stacked, coaxial array and extending from a position adjacent said central opening and perpendicularly into said housing, the central portion of said array embracing the neck portion of said bag, each of said toroidal elements having a radially inner portion that is radially extendable and contractible, said inner portion having a contracted position in which it defines an opening and being pneumatically extendable to close said opening;

(d) means, in pneumatic communication with each of said toroidal elements for inflating and deflating said inner portions, so as to radially extend and contract said portions;

(e) means for generating a relative negative air pressure about the exterior of said bag, so that a flow of air is generated to flow in the bag opening and out of said bag by way of its gas-permeable walls;

(f) liquid spray means including spray manifold mounted adjacent said central opening with a plurality of jets aligned about the periphery of said opening for spraying liquid inwardly; and

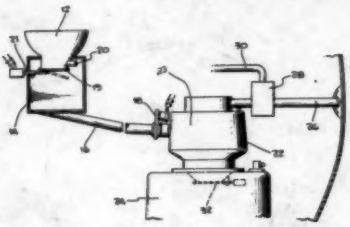
(g) control means for said inflating and deflating means, whereby said elements compress and release adjacent annular portions of said bag neck portion, according to a pre-determined sequence by which a peristaltic-like wave is generated across said neck portion in an axially inward direction.

4,955,091

METHOD AND APPARATUS FOR A VACUUM ASSISTED TOILET SYSTEM

Lawrence M. Grills, Viejo, and Eugene F. Colditz, Huntington Beach, both of Calif., assignors to Kaiser Aerospace and Electronics Corporation, Foster City, Calif.

Filed Aug. 12, 1988, Ser. No. 231,445
Int. Cl.[5] E03D *1/00*
U.S. Cl. 4—321 9 Claims



1. A vacuum assisted, non-recirculating toilet system adapted for use with a source of flushing liquid comprising in combination:

(a) a bowl for receiving waste matter wherein said bowl has a curved interior surface and includes:

(i) a first exit port at the bottom of said bowl;

(ii) a gravity operated flapper valve coupling said bowl to said interim holding tank;

(iii) locking means for disabling said flapper valve in the closed position;

(iv) a second exit port adjacent said first exit port but extending substantially tangentially to said curved interior surface for introducing waste matter into said interim holding tank with tangential velocity when assisted by a vacuum;

(b) an interim holding tank coupled to said bowl for temporarily storing flushed waste matter;

(c) vacuum assisted separator means;

(d) waste drain means coupling said interim holding tank to said separator means for conveying waste matter thereto;

(e) a main waste tank coupled to said separator means and adapted to receive waste matter therefrom whenever said waste tank and said separator means are at pressure equilibrium;

(f) pressure resistant shut off valve means interposed in said waste drain means between said interim holding tank and said separator means;

(g) flushing means coupled to the source of flushing liquid for applying a predetermined limited amount of flushing liquid to said bowl for transferring any waste matter to said interim holding tank; and

(h) means adapted to be connected to the external environment for creating a partial vacuum in said separator means whenever the exterior environmental air pressure is substantially lower than the air pressure in the vicinity of said bowl,

whereby opening said shut off valve means permits waste matter accumulated in said waste drain means and said interim holding tank to flow therethrough under a pressure differential from said holding tank to said separator means, and whereby said locking means are employed whenever a vacuum assist is used to transfer waste matter form said bowl so that the waste matter acquires sufficient velocity to resist dispersion in directions lateral to the direction of flow.

4,955,092

SWIMMING POOL COVER

Thomas F. Hagan, 85-66 - 6th Ave., Rego Park, N.Y. 11374

Filed Nov. 16, 1989, Ser. No. 437,111
Int. Cl.[5] E04H 3/19
U.S. Cl. 4—502 2 Claims

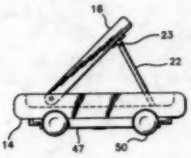
1. A flexible cover structure for a swimming pool comprising two parallel horizontal tracks extending along opposite sides of a swimming pool; a flexible cable running within each track; a flexible cover extending across the space between the cables; a rotary drum at one end of the pool; two spaced pulleys at the other end of the pool; said cables extending within the tracks and around the pulleys; said flexible cover having one end thereof wrapped around the drum, and the other end thereof movable between opposite ends of the pool, a first cover-opener motor at said one end of the pool for operating said drum, and a second cover-closer motor at the other end of the pool for operating the spaced pulleys, a safety device incorporated into said other end of the flexible cover comprising an electrical carrying cable extending across said other end and carrying an electrical current not harmful to humans, for responding to physical engagement between a person or object and said other end of the cover when said second motor is in the process of closing the cover, said safety device including appropriate circuitry to convey said current to said cable and to respond to said engagement by stopping said second motor and starting said first motor.

4,955,093

COMBINATION BATH TUB SHELF AND BENCH

Lorraine J. Klassen, 2430 Vineyard, Escondido, Calif. 92025

Filed Jul. 13, 1988, Ser. No. 218,580
Int. Cl.[5] A47K 3/022
U.S. Cl. 4—579 3 Claims



1. A combination bathtub shelf and bench comprising:

an elongated shelf member having a front edge, a rear edge and laterally spaced side edges, said shelf member having a flat top surface, a flat bottom surface and a predetermined length that spans the width of a bathtub;

a raised lip structure formed integrally with said shelf member and it extends upwardly from the top surface of said shelf member around its entire perimeter;

a reading easel having a front edge, a rear edge and laterally spaced side edges, said reading easel also having a top surface and a bottom surface;

the top surface of said shelf member has a recess formed therein in the configuration of said reading easel so that in its stored position the top surface of said easel is flush with the top surface of said shelf member;

a hinge member pivotally securing the front edge of said reading easel to the top surface of said shelf member adjacent its front edge, said hinge member being located in the recess that receives said reading easel;

a support leg having its top end pivotally hinged to the rear surface of said reading easel;

means cooperating with a bottom end of said support leg for securing said reading easel at various angles of inclination to the top surface of said shelf member;

means on the bottom surface of said shelf member for detachably securing said combination bathtub shelf and bench to the lateral side walls of a bathtub so that said shelf will not slide longitudinally along the length of the bathtub, said means comprising two position securing assemblies, one position securing assembly is mounted adjacent one side edge of said shelf member and the other position securing assembly is mounted adjacent the other side edge of said shelf member, two pairs of laterally spaced L-shaped side tracks are mounted on the bottom surface of said shelf member adjacent its respective side edges and they slidably receive said respective position securing assemblies, said position securing assemblies each being formed of a spacer bar having a slide tab extending laterally from its respective ends that slide in said respective pairs of L-shaped side tracks; and

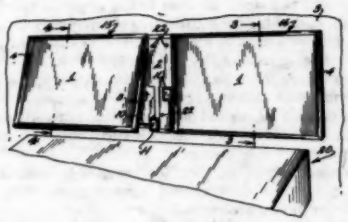
means on the bottom surface of said shelf member for structurally reinforcing said shelf so that it may function as a bench on which a person can sit in a bathtub while bathing, said reinforcing means comprising an integrally formed grid like reinforcing frame having a front wall, a rear wall, laterally spaced end walls and a pair of diagonally extending intersecting gussets.

4,955,094

HEAD-BOARD RECLINER USING THE ONLY ONE HINGE

Peirce J. Mullaly, 28871 Hogan, Sun City, Calif. 92381

Filed Dec. 12, 1988, Ser. No. 282,605
Int. Cl.[5] A47C 20/00
U.S. Cl. 5—433 4 Claims



1. A headboard recliner for use with a bed, said recliner including;

a mounting board having upper and lower ends and with means for securing to a supporting structure:

an adjustable recliner means having upper and lower ends;

a first hinge means interconnecting the upper end of said mounting board and the upper end of said adjustable recliner means;

a leg means attached to the lower end of said recliner means by a second hinge at one end;

a sliding pad with a slotted guide means mounted to the lower end of said mounting board and receiving the other end of leg means;

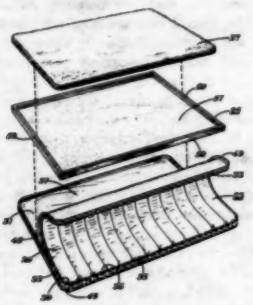
said leg means being adjustably moveable within said slotted guide means to thereby allow pivoting of said recliner relative to said mounting board from first substantially vertical position wherein the leg is at a upper end of said slot, to a second inclined position wherein the leg is at the lower end of said slot.

4,955,095

REMOVABLE PILLOW TOP POR MATTRESS

Jack M. Gerrick, Fort Worth, Tex., assignor to International Bedding Corporation, Fort Lauderdale, Fla.

Filed Mar. 3, 1989, Ser. No. 318,650
Int. Cl.[5] A47C 20/02
U.S. Cl. 5—446 15 Claims



1. A pillow top device for use with a bed mattress, comprising:

(a) a cover having first and second walls positioned adjacent to each other so as to be generally parallel, said first and second walls having edges which are coupled together so as to form an interior space between said first and second walls, said cover having an opening that allows access from said interior space from the exterior of said cover, said cover having means for opening and closing said opening;

(b) cushion means for providing a cushion, said cushion means being, locatable in said interior space via said opening, wherein said closure means allows the removal of said cushion means;

(c) support means for providing support of said cover and said cushion means, said support means having a bottom wall and side walls coupled to the edges of said bottom wall, said side walls extending transversely from said bottom wall so as to form a shallow cavity, said cushion means being received by said shallow cavity, said support means being locatable in said cover interior space via said opening such that said bottom wall is interposed between said cushion means and one of said walls of said cover and such that said cushion means is surrounded by said support member side walls;

(d) fastener means adapted for removably fastening said cover to a bed mattress, said fastener means being on the exterior of said second wall.

4,955,096

ANATOMICALLY CONTOURED CONVOLUTED FOAM PAD

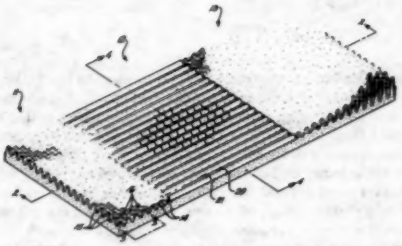
Keith Gilroy, Upland; Gary T. Limon, San Dimas, and David F. Buchicchio, Glendora, all of Calif., assignors to Bio Clinic Corporation, Rancho Cucamonga, Calif.

Filed Jun. 28, 1989, Ser. No. 372,911
Int. Cl.[5] A47C 27/14
U.S. Cl. 5—464 10 Claims

1. An anatomically contoured pad of a size sufficient for a human body on a bed, pad being el between two pad ends and having a and lower surface, the upper surface comprising;

a head supporting section, and a foot and leg supporting section, each adjacent to one of the two pad ends and each having a convoluted supporting surface of adjacent rows of peaks separated by depressions, the rows of peaks extending transversely across the width of each section and longitudinally along the length of each section with alternate rows of peaks being staggered in both the transverse and longitudinal directions to form a checkerboard pattern; and

a torso supporting section intermediate the head and foot supporting sections comprising a ribbed convoluted supporting surface having substantially continuous and parallel ribs separated by substantially continuous and parallel valleys extending longitudinally between the head and foot supporting sections, and a plurality of slits in said



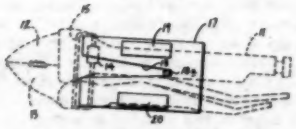
ribbed convoluted supporting surface wherein the slits are perpendicular to the ribs, with the depth of the center slit being greatest and the relative depth of each of the remaining slits being progressively shallower towards the head and foot ends of the pad and with the depth of each slit being greatest for that portion of the slit in the center portion of the pad and the depth of each slit being progressively shallower towards the edges of the pad.

4,955,097

BELT BUCKLE WRENCH

Thomas C. Roderer, 308 Washington Ave., Downingtown, Pa. 19335

Filed Nov. 6, 1989, Ser. No. 432,372
Int. Cl.[5] B25F 1/00
U.S. Cl. 7—138 2 Claims



1. A belt buckle wrench for use with a belt that includes a fixed end and a free end, wherein the free end includes a series of apertures, the apparatus comprising,

a wrench member including a fixed jaw mounted at a forward terminal end of a handle, and

a movable jaw mounted for cooperation with a fixed jaw for securement of a workpiece therebetween, and

a first means pivotally mounted on the handle for securement of the fixed end of the belt thereto, and

a second belt mounting means mounted on the handle rearwardly of the first means and of the fixed jaw for directing through one of said apertures of the free end of the belt to secure the front of the belt relative to the wrench member, and

the first means includes a hinged loop integrally mounted to the rear surface of the handle and arranged orthogonally relative to the handle and pivotally mounting a continuous belt securement loop therethrough in a pivotal movable relationship relative to the hinged loop, and

the second means includes an "L" shaped hook, the "L" shaped hook fixedly mounted on the rear surface of the handle with the free end of the hook aligned with the handle and directed towards the hinged loop and belt securement loop, and

further including a support plate, the support plate defined by a predetermined length less than that of the wrench, and formed with an elongated slot oriented medially of the plate and terminating at a mid portion of the plate for receiving the "L" shaped hook therethrough.

4,955,098

POT-SHAPED SUPPORT FOR STRUCTURES, ESPECIALLY BRIDGE STRUCTURES

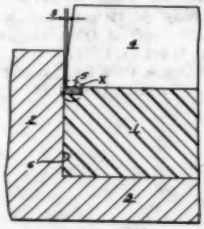
deceased Bayer, late of Grosserlach (by Gloria Bayer, executor), and Hans Beutler, Munich, both of Fed. Rep. of Germany, assignors to Schwäbische Hüttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Mar. 21, 1989, Ser. No. 326,386

Claims priority, application European Pat. Off., Mar. 21, 1988, 88104510.8

Int. Cl.[5] E01D *19/00*

U.S. Cl. 14—16.1 7 Claims



1. In a pot-shaped or bowl-shaped support for structures, especially bridge structures, including a pot having a pot wall, the pot receiving a pressure pad of elastomer upon which a lid rests which transmits the load of the structure or the bridge resting upon it to a foundation, abutment or a pillar, and in which an annular gap defined between the lid and the pot wall is sealed by means of an annular seal, the improvement comprising the annular seal (5) being an open, single part, compact ring of rectangular cross-section, the ring being of a PTFE-material of amorphous consistency filled with a powdery substrate.

4,955,099

MOVABLE SUPPORT

Carl F. W. Supra, Transvaal, South Africa, assignor to Liberty Pool Products S. A., Geneva, Switzerland

Filed Feb. 7, 1989, Ser. No. 307,048

Claims priority, application South Africa, Apr. 13, 1988, 88/2572

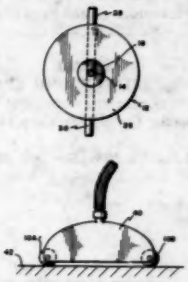
Int. Cl.[5] B60B *37/00*

U.S. Cl. 15—1.7 4 Claims

1. A swimming pool cleaner useable to clean a submerged swimming pool surface, said swimming pool cleaner comprising:

a suction head movably supported spaced from the pool surface to be cleaned; and

a plurality of movable supports affixed to, and movably supporting said suction head, each of said movable supports having a first axle rotatably supported by said suction head, and first and second stub axles, said first and second stub axles being attached to said first axle and



extending in opposing directions generally perpendicular to, and away from, said first axle, said first and second stub axles rotatably supporting first and second hemispherical members for independent rotation of said first and second stub axles on opposing sides of said first axle, each of said movable supports being affixed to said suction head to position a surface portion of one of said first and second hemispherical members projecting beyond an outer peripheral surface portion of said suction head.

4,955,100

APPARATUS FOR CLEANING PIPELINES FOR BEVERAGES AND THE LIKE

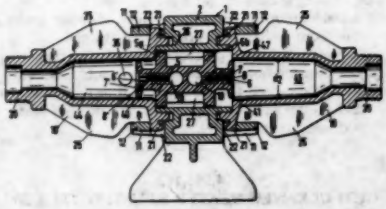
Friedrich Bersch, Industriestrasse 18, D-5401 Halsenbach, Fed. Rep. of Germany

Filed Jul. 21, 1989, Ser. No. 384,208

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824860; Jul. 21, 1988, 3824873

Int. Cl.[5] B08B *9/02*; F15B *13/02*

U.S. Cl. 15—3.51 24 Claims



1. Apparatus for cleaning pipelines of the type having a finite length and serving to convey beverages and the like with a liquid cleaning agent which contains at least one cleaning element, comprising a shuttle valve including a body having inlet means and outlet means for, cleaning agent, a sleeve integral with said body and having a cylindrical internal surface of constant diameter, a first end and a second end, and a channeled shuttle installed in said sleeve and including two sealing members spaced apart from each other in the axial direction of and in sealing contact with said internal surface, said shuttle further including a portion disposed between said sealing members and defining with said surface a chamber; first hollow coupling means for conveying cleaning agent between

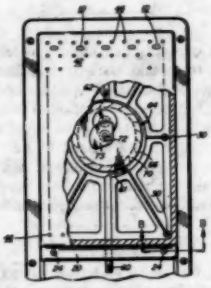
the first end of said sleeve and one end of a pipeline to be cleaned; and second hollow coupling means for conveying cleaning agent between the second end of said sleeve and the other end of the pipeline to be cleaned, said shuttle being movable in said sleeve by cleaning agent between a first position in which the shuttle establishes communication between said inlet means and said first coupling means as well as between said second coupling means and said outlet means by way of said chamber, and a second position in which the shuttle establishes communication between said inlet means and said second coupling means as well as between said first coupling means and said outlet means by way of said chamber.

4,955,101

BODY SCRUBBING BRUSH APPARATUS

Martin J. King, Surrey, Canada, assignor to Hope Technologies Corp. and Columbia Technology Corp., both of Vancouver, Canada

Filed Jul. 18, 1989, Ser. No. 381,367
Int. Cl.[5] A46B *13/06*
U.S. Cl. 15—21.1 **7 Claims**



1. A body scrubbing brush apparatus, comprising:
(a) a base support;
(b) a brush panel having a front brushing surface, said panel being connected to said base support for non-rotational movement in an orbital path relative to an axis extending perpendicular to said base support; the area described within said orbit path being substantially less than the area of said brushing surface and,
(c) an hydraulic driving means mounted to said base support, said driving means including:
(i) a water inlet for receiving a flow of water under pressure from a source of pressurized water;
(ii) a water outlet for discharging water so received; and,
(iii) a transmission operatively connected between said inlet, said outlet, and said panel for moving said panel in said orbital path in response to the flow of water from said inlet to said outlet.

4,955,102

VACUUM CLEANER BEATER BRUSH WITH A BIASED BRISTLE STRIP

Walter K. Cousins, Lexington, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 9, 1988, Ser. No. 269,075
Int. Cl.[5] A46B *9/08*
U.S. Cl. 15—182 **19 Claims**

1. A vacuum cleaner beater brush comprising:
a cylindrical dowel having at least one groove helically disposed in the outer periphery of said dowel for receiving a bristle strip, said groove having a pair of side walls with a channel formed in each of said side walls; and
a bristle strip having a bristle support section and beater bar integrally formed with a hinge disposed therebetween,
said bristle support section having bristle tufts extending upwardly therefrom, a first shoulder extending outwardly from one side of said bristle support section along the length thereof so as to be slidably received in a channel of said groove and a mating surface extending outwardly from an opposite side of said bristle support section along the length thereof,
said beater bar having a mating surface extending along the length thereof for mating with the mating surface of said

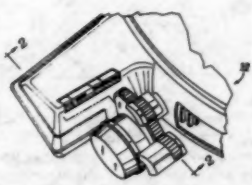
bristle support section and having a projection extending along the length of said beater bar, said projection abutting said bristle tufts when the mating surfaces of said bristle support section and beater bar mate, and
said hinge having an outer surface forming a shoulder adapted to be slidably received in a channel of said groove when the mating surface of said bristle support section and beater bar mate.

4,955,103

VACUUM CLEANER WITH SUCTION INDICATOR

Ernest R. Scott, Mayfield Heights, and James C. Murphy, Broadview Heights, both of Ohio, assignors to The Scott Fetzer Company, Westlake, Ohio

Filed Dec. 9, 1988, Ser. No. 282,466
Int. Cl.[5] A47L *9/28*
U.S. Cl. 15—319 **21 Claims**



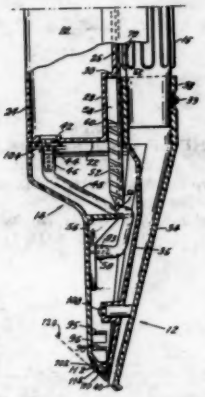
1. A vacuum cleaner having a suction nozzle inlet for cooperation with a surface to be cleaned, comprising in combination:
means for variably adjusting the height of the nozzle relative to a surface to be cleaned;
means to sense a differential air pressure between that of the atmosphere and that within the nozzle of the operating vacuum cleaner;
an electrical switch actuated in response to said differential pressure sensing means sensing a predetermined level of differential pressure;
a voltage source including terminals on the nozzle; and
indicator means connected electrically to said voltage source terminals through said switch whereby said indicator indicates to the operator that the height adjustment of the nozzle is proper due to the magnitude of the differential pressure a suction for most effective cleaning.

4,955,104

LIQUID DISPENSING AND SUCTIONING SYSTEM FOR SURFACE CLEANING

Jonathan Miller, Tenafly, N.J., assignor to Shop-Vac Corporation, Williamsport, Pa.

Filed Jun. 13, 1989, Ser. No. 365,479
Int. Cl.[5] A47L 7/00
U.S. Cl. 15—322 11 Claims



1. A liquid dispensing and suctioning system, comprising

a tubular wand having a suction intake end and an exit end connectable for communicating with a suction source;

an attachment to said wand for dispensing liquid to a surface to be cleaned and for suctioning liquid from the surface, said attachment comprising:

said attachment having a bottom;

a suction nozzle having an inlet at said bottom of said attachment and positionable adjacent the surface to be cleaned for intake of liquid and having an outlet fitting attached to said intake end of said wand; said suction nozzle inlet having a first periphery including a first front side and an opposite first rear side spaced from said first front side and between them defining an inlet opening for said suction nozzle inlet, said first front and rear sides of said suction nozzle inlet extending across said attachment;

a dispenser for selectively dispensing liquid to the surface to be cleaned, said dispenser including a dispenser inlet communicating with a supply of liquid, a dispenser outlet for delivery of liquid to the surface to be cleaned and a dispenser conduit between said dispenser inlet and said dispenser outlet;

said dispenser outlet having a second periphery at said bottom of said attachment and including a second front side that is closer toward said first rear side of said suction nozzle inlet and a second rear side that is further from said suction nozzle inlet, said second front and rear sides extending across said attachment;

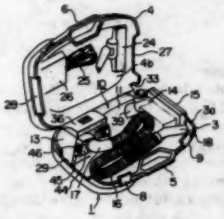
a liquid transmission surface at said bottom of said attachment and between said suction nozzle inlet first rear side and said dispenser outlet second front side, said transmission surface being so shaped and being of such height below said attachment, said first front and rear sides of said suction nozzle inlet being of such height below said attachment and said second front and rear sides of said dispenser outlet being of such height below said first attachment that with said liquid transmission surface disposed at the surface to be cleaned and with said first front surface of said suction nozzle disposed at the surface to be cleaned, said second front and rear surfaces of said dispenser outlet are upraised off the surface to be cleaned, whereby with said liquid transmission surface being in contact with the surface to be cleaned during dispensing of liquid by said dispenser, said liquid dispensed through said dispenser outlet travels past said liquid transmission surface for preventing direct migration of liquid from said dispenser outlet to said suction nozzle inlet without first passing around said liquid transmission surface.

4,955,105

VACUUM CLEANER

Masao Sunagawa; Fumio Jyoraku; Yoshitaro Ishii, all of Hitachi, and Susumu Satoo, Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 163,377
Claims priority, application Japan, Mar. 6, 1987, 62-50066; Mar. 6, 1987, 62-50072; Mar. 20, 1987, 62-63880; Mar. 20, 1987, 62-63883
Int. Cl.[5] A47L 9/00
U.S. Cl. 15—323 30 Claims



1. A vacuum cleaner comprising a vacuum cleaner body and an accommodating case for accommodating said vacuum cleaner body and attachments of the vacuum cleaner, said vacuum cleaner body comprising at least a dust collecting chamber, an electric blower chamber, and an exhaust chamber, said dust collecting chamber, said electric blower chamber and said exhaust chamber forming a unitary structure arranged in said accommodating case such that an outer profile of the exhaust chamber is in a confronting relationship with an exhaust opening of the accommodating case, wherein at least a suction opening communicating with said dust collecting chamber and the exhaust opening communicating with said exhaust chamber are formed in said accommodating case, and wherein said accommodating case includes a body case for accommodating at least said vacuum cleaner body and a cover case for accommodating said attachments of the vacuum cleaner, said cover case being adapted to close an opening of said body case forming the opening of said accommodating case.

4,955,106

UPRIGHT VACUUM CLEANER

Klaus Stein, and Heinz Kaulig, both of Velbert, Fed. Rep. of Germany, assignors to Stein & Co. GmbH, Velbert, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,032
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909408
Int. Cl.[5] A47L 5/32
U.S. Cl. 15—335 9 Claims

1. An upright vacuum cleaner for movement along a floor comprising:

a housing having suction producing means:

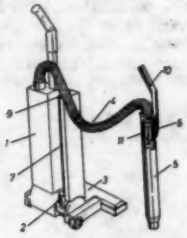
said housing having a lower end;

said housing having a floor suction component at said lower end thereof;

said housing having a upper end remote from said lower end;

said housing having an operating handle at said upper end;

said floor suction component having wheel means for movement of said housing along the floor;
said floor suction component including rotating brush means for dislodging dirt and the like from the floor;
a hose having a first end which is for being connected to said housing at said upper end thereof for transporting air to said suction producing means;
a removable tube for being selectively mounted on said housing;



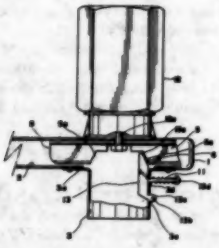
said removable tube having a first end for selective connection to said floor suction component when said removable tube is mounted on said housing;
said removable tube having a second end which is disposed at said upper end of said housing when said removable tube is mounted thereon; and
said hose having a substantial portion including a second end thereof which is remote from said first end for being received within said removable tube when said removable tube is mounted on said housing.

4,955,107

SUCTION CLEANER

Yuzo Kawai, Nara, Japan, assignor to Kabushiki Kaisha Suiden, Osakashi, Japan

Filed Jul. 22, 1988, Ser. No. 222,748
Claims priority, application Japan, Mar. 2, 1988, 63-50152
Int. Cl.[5] A47L *5/24*
U.S. Cl. 15—339 **5 Claims**



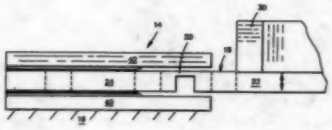
1. A suction cleaner for use in sucking relatively large refuse, the cleaner comprising:
a dust chamber;
a suction chamber communicating with the dust chamber;
an outlet duct tangentially connected to the dust chamber for letting the refuse out of the dust chamber;
a plurality of edged impellers mounted in the dust chamber for producing suction with the suction chamber, the impellers being fixed to a rotating shaft protruding into the dust chamber;
first blades provided at an inner side of at least one of the impellers;
a second blade formed in a shank provided in the suction chamber, the shank being retainable at one of an operative position at which the second blade is juxtaposed to the first blades with such a gap as to shred the refuse therebetween, and an inoperative position at which the second blade is kept away from the first blades; and
drive means for rotating the impellers through the rotating shaft and producing suction within the suction chamber.

4,955,108

PROTECTED HINGE ASSEMBLY FOR MECHANICAL ACCELEROMETER

Nicholas F. Pier, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Alameda, Calif.

Filed Jul. 14, 1989, Ser. No. 380,135
Int. Cl.[5] E05D *1/02*; B23K *31/02*
U.S. Cl. 16—226 **106 Claims**



1. A protected hinge assembly comprising:
a hinge frame having first and second parts which have substantially flat opposite surfaces each having first and second juxtaposed regions near first and second substantially opposite side edges thereof, said first regions of said first and second parts being connected by a flexible hinge having a hinge line directed in a predetermined first direction;
first and second stops, substantially rigidly attached along second and third lines to opposite surfaces, in said second regions near and substantially parallel to the outer edges of said second parts of said surfaces and being substantially perpendicular to said hinge line;
said stops being tilted substantially about said second and third lines relative to said surfaces to allow slight movement of the first regions of said second part relative to said stops.

4,955,109

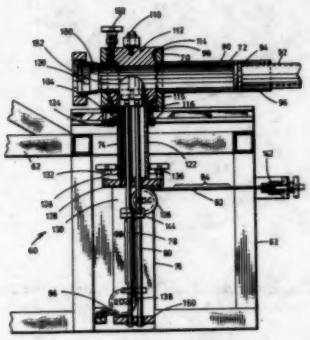
PIVOTING HORN

Alfred J. Evans; Raymond H. Misner, both of Raleigh, and Dennis J. May, Pittsboro, all of N.C., assignors to Delaware Capital Formation, Inc., Apex, N.C.

Filed Sep. 20, 1989, Ser. No. 410,085
Int. Cl.[5] A22C *11/02*
U.S. Cl. 17—41 **10 Claims**

1. For chub packaging machinery, utilized to produce chub products by stuffing of casing with comminuted material, a stuffing horn mechanism comprising:
a telescoping stuffing horn, the horn being variable in volume during telescoping;

a comminuted material reservoir in communication with the stuffing horn; and



means operatively connected to the stuffing horn, for varying the volume of the reservoir in inverse relation to the volume of the stuffing horn during telescoping.

4,955,110

APPARATUS FOR COLLECTING ROE

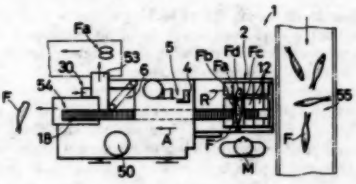
Yutaka Ogawa, Ibaraki, Japan, assignor to Nippon Fillestar Co., Ltd., Osaka, Japan

Filed Jul. 7, 1989, Ser. No. 376,596

Claims priority, application Japan, May 12, 1989, 1-120174

Int. Cl.[5] A22C *25/14*

U.S. Cl. 17—53 **6 Claims**



1. An apparatus for collecting roe, comprising:

conveying means for gripping and conveying decapitated fish bodies in a lying position, with the tails of the fish bodies extending in a common direction and with the abdomens of the fish bodies facing downstream with respect to the direction of conveyance of said conveying means for gripping and conveying, said conveying means for gripping and conveying comprising stopping means for holding the fish bodies stationary in said lying position; and

collecting means for collecting roe from the fish bodies conveyed by said conveying means, said collecting means comprising a collecting member for abutment against the abdomens of the fish bodies, said collecting member being rotatable about a rotation axis extending across the direction of the conveyance of said conveying means, and said collecting member being elastically biased upstream with respect to said direction of conveyance.

4,955,111

TRAVELLING FLATS ASSEMBLY FOR A CARDING MACHINE

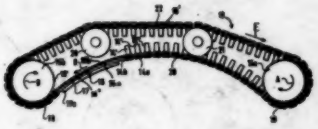
Peter Jagst, Mönchengladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Sep. 25, 1989, Ser. No. 411,362

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832484; Mar. 8, 1989, 3907396

Int. Cl.[5] D01G *15/08*

U.S. Cl. 19—102 **24 Claims**



1. A travelling flats assembly for a carding machine, comprising

(a) two end rollers;

(b) an endless flexible belt trained about the end rollers for a circulating travel and having a lower, working flight and an upper, return flight; said endless flexible belt further having an outwardly-oriented face and an inwardly-oriented face;

(c) a plurality of clothed flat bars arranged to be entrained by said endless flexible belt for circulating travel therewith; each said flat bar having a head forming a longitudinal end of the flat bar;

(d) a stationary slide guide extending between said end rollers along said lower flight and slidably engaging and supporting the flat bars when entrained for travel by said lower flight; and

(e) form-fitting connecting means for coupling the head of each flat bar to said outwardly-oriented face of said endless belt; said form-fitting connecting means allowing unobstructed freedom of motion of each flat bar in a direction generally perpendicularly away from and towards said outwardly-oriented face, whereby said flat bars are freely removable from and placed in an operative position onto the outwardly-oriented face of the upper flight of said endless belt.

4,955,112

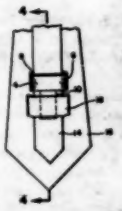
TIE CLIP

Joseph B. Porter, 20 Meadow La., Albany, N.Y. 12208

Filed Nov. 8, 1989, Ser. No. 433,326

Int. Cl.[5] A41D *25/04*

U.S. Cl. 24—49 C **18 Claims**



1. A necktie retainer comprising:

a first portion having a shape whereby it can extend into a tie loop and be free to vertically move therein; and

a second portion attached to said first portion, said second portion including means for grasping a portion of a shirt

wherein said grasping means includes a member which is shaped to fit inbetween overlapping shirt layers.

4,955,113

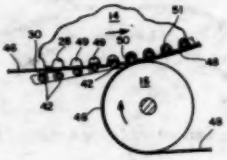
FASTENING MEANS, APPARATUS, AND METHODS

Gregory J. Rajala, and Lou M. King, both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 118,120, Nov. 4, 1987, Pat. No. 4,861,399. This application Apr. 25, 1989, Ser. No. 343,961

Int. Cl.[5] A44B *18/00*

U.S. Cl. 24—448 **7 Claims**



1. A fastening material, comprising;

(a) a backing material comprising a thermoplastic surface layer, said thermoplastic surface layer forming an outer surface of said backing material; and

(b) an array of flexible, generally U-shaped filament segments, each said filament segment including a bight portion bonded to said thermoplastic surface layer and covering a portion of said outer surface of said backing material, and two stem portions extending from opposite ends of said bight portion and projecting in a direction generally away from said thermoplastic surface layer, at least one of said stem portions having a terminal fastening member,

(c) said U-shapes in said filament segments being formed by pins urging first portions of said filament segments into grooves on a forming wheel, said bight portions corresponding to second portions of said filament segments, said second portions being between corresponding first portions of said filament segments, the configuration of said bight portions being formed from said filament segments by land zones on said forming wheel between said grooves, said bight portions being bonded to said outer surface of said backing material in formation of said bight portions,

(d) said U-shaped filament segments being intermittently spaced, and corresponding to intermittent spacing of said land zones, and corresponding extending ones of said grooves, on said forming wheel.

4,955,114

APPARATUS FOR CAUSING THE SHRINKING OF A CLOTH

Franco Bertoldo, Brogliano, Italy, assignor to Sperotto Rimar S.p.A., Thiene, Italy

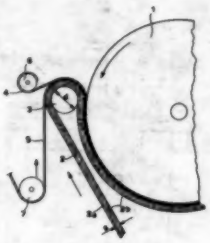
Filed Oct. 5, 1989, Ser. No. 417,582

Claims priority, application Italy, Oct. 14, 1988, 22304 A/88

Int. Cl.[5] D06C *21/00*

U.S. Cl. 26—18.6 **3 Claims**

1. Apparatus for causing the shrinking of a cloth, comprising a drum revolving around its own longitudinal axis, an endless-loop belt made from a textile material of the type of needled felts wound with a first one of its faces around said revolving drum, a return roller for said belt so positioned as to cause said first face of said endless belt to adhere to said drum, a flexible sheet partially winding around said first face of said belt in the region in which the belt, with its second face, is wound around the return roller, and which subsequently extends entering a portion in which said belt is wound around said drum, and guide means for guiding the cloth to be processed and deposit it onto said first face of said belt immediately before said belt is wound by said flexible sheet around the belt return roller, so as to cause the cloth to enter the room existing between said flexible sheet and the first face of said belt, characterized in that



the ratio of the diameter of said return roller to the thickness of the belt is lower than 5.5.

4,955,115

BUCKLE DEVICE

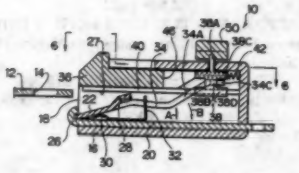
Kohbun Tanaka, Niwa, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Jul. 11, 1989, Ser. No. 378,045

Claims priority, application Japan, Jul. 11, 1988, 63-91758; Jul. 13, 1988, 63-92940

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—641 **19 Claims**



1. A buckle device capable of locking a tongue plate inserted into the buckle device and capable of allowing said tongue plate to be drawn out by releasing said tongue plate from the locked state, said buckle device comprising:

a lock member capable of swinging between a first position at which it engages with said tongue plate in a path for insertion of said tongue plate to lock the same, and a second position at which it is displaced out of said tongue plate insertion path to allow said tongue plate to be drawn out;

an urging means for urging said lock member toward said first position;

an operation member for displacing, by moving operation, said lock member against the urging force of said urging means from said first position to said second position to disengage said tongue plate and said lock member from each other;

a first stopper member selectively moved relative to said operation member between a third position at which it allows said moving operation of said operation member and a fourth position at which it inhibits said moving operation of said operation member; and

a second stopper member moved relative to said lock member in a linked relationship with said first stopper member, said second stopper member being positioned out of a path for swinging of said lock member to enable said lock member to swing from said first position to said second position when said first stopper member is placed at said third position, said second stopper member being posi-

tioned in the swinging path of said lock member to inhibit said lock member from swinging from said first position to said second position when said first stopper member is placed at said fourth position.

4,955,116

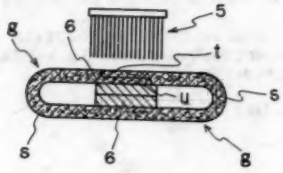
METHOD FOR PRODUCING TUBULAR NEEDLE PUNCHED FELT

Katsuyoshi Hayamizu, Moriyama; Masakatsu Nakajima, Kusatsu, and Hiroyuki Ogawa, Kashiwa, all of Japan, assignors to Japan Vilene Company, Ltd., Tokyo, Japan

Filed Sep. 6, 1989, Ser. No. 403,422

Int. Cl.[5] D04H *1/46*

U.S. Cl. 28—110 **3 Claims**



1. A method for producing a tubular needle punched felt, comprising the steps of:

(a) overlapping not less than two long sheets comprising a web to form thin layer portions at both side edges of the overlapped sheets and a thick layer portion at the central portion of the overlapped sheets by dislocating the sheets in width direction;

(b) needle punching one part or whole of said central thick layer portion of the overlapped sheets to form a lapped sheet;

(c) rolling the lapped sheet and transforming the lapped sheet into a tubular lapped sheet and overlapping said thin layer portions with each other; and

(d) needle punching said overlapped thin layer portions to make the thin layer portions one body.

4,955,117

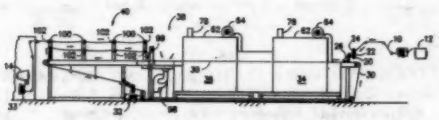
APPARATUS FOR HOT AIR BULKING OF SYNTHETIC YARN

Edward L. Crenshaw, Inman, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 26,656, Mar. 17, 1987, abandoned. This application Sep. 4, 1987, Ser. No. 78,058

Int. Cl.[5] D02J *1/02*

U.S. Cl. 28—281 **6 Claims**



1. Apparatus to provide a bulked, synthetic yarn comprising: a perforated endless conveyor, a first means to supply a synthetic yarn onto said conveyor in coiled form to form loops therein, a bulking oven, a heat setting oven, a loop removal station, means to drive said endless conveyor sequentially through said bulking oven and said heat setting oven to said loop removal station, means to supply a dry gaseous fluid into said bulking oven to bulk the yarn on said endless conveyor, means to supply a dry gaseous fluid into said heating setting oven to heat set the yarn on said endless conveyor and means operably associated with said apparatus to take up the bulked yarn after the loops have been pulled out at the loop removal station, said bulking oven having a means to bypass the heated gaseous fluid from contact with the synthetic yarn when said endless conveyor is stopped and a means to supply cool air onto said endless conveyor when said endless conveyor is stopped.

4,955,118

METHOD OF MANUFACTURING A ROLL OF COILED, CLAMPED BARBED WIRE

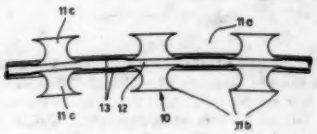
Gerhard Lange, Reutlingen, Fed. Rep. of Germany, assignor to WAFIOS Maschinenfabrik GmbH & Co. Kommanditgesellschaft, Fed. Rep. of Germany

Division of Ser. No. 213,763, Jun. 30, 1988. This application May 5, 1989, Ser. No. 348,899

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721466

Int. Cl.[5] B21F *25/00*

U.S. Cl. 29—7.1 **4 Claims**



1. A method for the manufacture of a circular roll of coiled barbed strap having loops, the loops of which are provided in pairs with clamps in an uneven number of at least three per loop and can be separated from each other in the axial direction of the roll in such a manner that each strap loop pivots about a screw-type line, in which the barbed strap is coiled, in which clamps are placed at a location on every two adjacent loops according to the number of clamps per loop, and after which, the barbed strap is cut; said method comprising:

producing barbed strap loops without a core;

coiling the barbed strap corresponding to the number of clamps per loop, interrupting said coiling at predetermined intervals and then placing a clamp when the strap is stationary; and

synchronously guiding the two loops of the barbed strap to be clamped, outside of the interruption intervals, through the location where the clamps are placed.

4,955,119

MULTI-TASK END EFFECTOR FOR ROBOTIC MACHINING CENTER

Giovanni B. Bonomi, and Battistino Oldani, both of Rockford, Ill., assignors to Imta, Rockford, Ill.

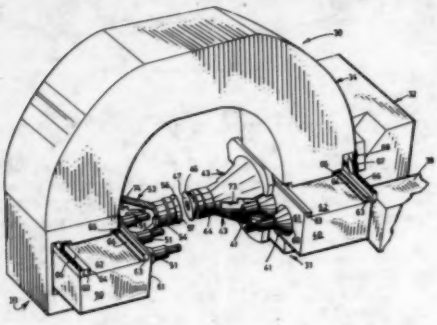
Filed Jul. 11, 1989, Ser. No. 378,019

Int. Cl.[5] B23B *29/00*

U.S. Cl. 29—50 **11 Claims**

1. An end effector attachable to the mobile head of a computer controlled robotic machining center operable to move the mobile head along multiple linear and about multiple rotational axes comprising: a master tool head, a slave tool head, attachment means for connecting said master head to the mobile head of said robotic machining center for multi axis movement with the latter, a substantially U-shaped hollow yoke rigidly fixed at one end to said master head and attached at its other end to said slave head such that the two heads are disposed in coaxial, opposing, spaced relationship; power console means on said attachment means for connecting said master head and slave head to common pneumatic, hydraulic and electrical power supply means carried by the machining cen-

ter, and plural power driven tool drivers mounted on each said head and adapted to be selectively energized by said power



supply means for driving selected tools mounted on said drivers.

4,955,120

HYDROSTATICALLY SUPPORTED ROLL

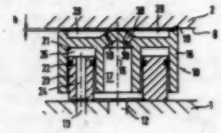
Bernhard Brendel, Gregath; Klaus Kubik, Tönisvorst, and Karl-Heinz Küsters, Krefeld, all of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,254

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813598

Int. Cl.[5] B21B *13/02*

U.S. Cl. 29—113.2 **9 Claims**



1. A hydrostatically supported roll comprising:

(a) a rotating hollow roll having an outer working roll circumference;

(b) a stationary crosshead extending through the hollow roll to form surrounding clearance space with an inner circumference of the hollow roll;

(c) a plurality of hydrostatic elements supported by the crosshead and arranged in at least one row along the crosshead for supporting the inner circumference of the hollow roll, each hydrostatic element having,

(i) support pockets formed in an outer contact surface of the hydrostatic element, said pockets being open toward the inner circumference of the hollow roll and bounded by a surrounding edge spaced from the inner circumference when a first pressurized liquid conducted to the support pockets flows over the surrounding edge to form a liquid film transmitting contact pressure to the inner circumference of the hollow roll for supporting same;

(ii) a pressure chamber to which a second pressurized liquid is conducted for pressing the hydrostatic element against the inner circumference of the hollow roll with a predetermined force, with the pressure chamber of at least one of the hydrostatic elements being separate from its support pockets; and

(iii) means for adjusting the predetermined force independently of the other hydrostatic elements by adjusting the pressure in the pressure chamber;

(d) a first temperature control device for controlling the temperature of the first pressurized liquid, which transmits heat to the hollow roll as the first pressurized liquid flows over the surrounding edges of the support pockets; and

(e) a flow control device connected to the support pockets controlling the flow of first pressurized liquid to provide a constant flow of the first pressurized liquid over the surrounding edges of the support pockets.

4,955,121

METHOD FOR PRODUCING A ROCKER ARM FOR USE IN AN INTERNAL COMBUSTION ENGINE

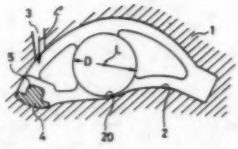
Masakazu Sato, Tochigi; Seiichi Koike, Saitama; Toshihiro Oikawa, and Keisuke Ban, both of Tochigi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 9, 1987, Ser. No. 71,652

Claims priority, application Japan, Jul. 9, 1986, 61-161737; Jul. 9, 1986, 61-161738

Int. Cl.[5] B21K *1/24*

U.S. Cl. 29—888.2 **2 Claims**



1. A method for producing a rocker made of light alloy for use in an overhead cam shaft type valve operating mechanism of an internal combustion engine, which rocker arm includes a thick-walled bearing section elongated along an axis to contain a rocker arm shaft hole for fitting with a rocker arm shaft, comprising the steps of:

injecting molten metal under pressure into a cavity of a metallic mold for casting the rocker arm,

exerting a secondary pressurizing force upon said bearing section just before the molten metal solidifies by advancing a pressurizing rod into said cavity to form a hole in said bearing section during casting substantially concentric with a locus for the rocker arm shaft hole by displacing molten metal in said cavity in a radial direction from said pressurizing rod, said pressurizing rod having an outer diameter d=0.17 D to 0.60 D, wherein D equals an outer diameter of the bearing section and d is smaller than the rocker arm shaft diameter, and

machine finishing said rocker arm shaft hole after casting.

4,955,122

LOCK UNIT FOR A FLUID COUPLING APPARATUS

Noboru Ootsuki; Katsumi Tomioka, both of Kobe, and Toshihiko Oonishi, Kakogawa, all of Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Sep. 27, 1989, Ser. No. 413,139

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—237 **2 Claims**

1. A lock unit for a fluid connecting and disconnecting apparatus of a construction in which one fluid coupling is held stationary and a second fluid coupling is moved into connection with said one fluid coupling comprising:

a main body,

a first connecting member stationary on said main body, said first connecting member having a first connection opening and means for holding said one fluid coupling,

a second connecting member opposing said first connecting

member and movably mounted on said main body for movement toward and away from said first connecting member, said second connecting member having a second connection opening and means for holding said second fluid coupling,

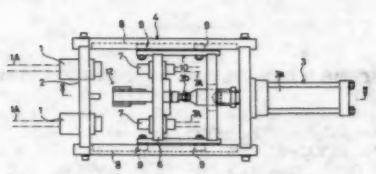
an actuator cylinder mounted to said main body and having a piston rod for moving said second connecting member,

a flange provided in said second connection opening,

a lock lever, said lock lever having one end provided between said flange and said second connection opening, and being rotatable relative to said second connection opening, a second end of said lever having a hook for detachably locking said lever to said first connecting member,

a pin mounted to said lever and a toggle link connecting said second end of said lever to an end of said piston rod projecting through said second connection opening,

a dog provided between said flange and said toggle link connection with said piston rod,



said dog being biased toward said toggle link connection,

a slot in said dog and receiving said pin, said slot having a first portion extending in a longitudinal direction of said lever and a second portion normal to said first portion, said pin riding in said first portion of said slot and preventing outward movement of said second end of said lever as said dog is biased toward said toggle link connection and said piston rod is moved to move said second connecting member toward said first connecting member and said pin is movable into said second portion of said slot as said dog contacts said first connecting member and displaces the means biasing said dog to permit outward movement of said second end of said lever to engage said hook with said first connecting member and detachably lock said second connecting member with said first connecting member with said second fluid coupling connected to said one fluid coupling.

4,955,123

PRODUCTION OF A SHAPED FILAMENTARY STRUCTURE

Peter G. Lawton, West Hadlow, Albert Promenade, Halifax, West Yorkshire, England HX2 6AD, and Norman Smith, 5 Badby Leys, Rugby, Warwickshire, England CV22 5RB

Filed Jan. 27, 1987, Ser. No. 6,899

Claims priority, application United Kingdom, Jan. 28, 1986, 8602003

Int. Cl.[5] B23P *17/00*

U.S. Cl. 29—419.1 **15 Claims**

1. A method of producing a shaped filamentary structure comprising the steps of: subjecting uni-directional layers of filaments to a needle punching action to give a degree of dimensional stability to the layers adequate to allow severing and manipulation of the layers; cutting a plurality of segments from the layers; assembling at least two of the segments in side-by side contiguous relationship to produce a first filamentary layer of the required structural shape; superimposing at least one of the similarly formed filamentary layers on the first layer and needle punching the assembled layers to produce cross linking of the layers by filaments displaced out of the layers and extending in a direction generally perpendicular to the faces of the layers.

4,955,124

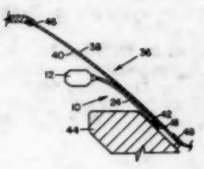
SHEATHED CUTTING MEANS APPARATUS AND METHOD

Ray Asbery, 1401 Mesa Park Dr., Round Rock, Tex. 78664

Continuation of Ser. No. 118,060, Nov. 9, 1987, abandoned. This application Aug. 15, 1989, Ser. No. 394,273

Int. Cl.[5] B26B *7/00, 29/00*

U.S. Cl. 29—426.4 **8 Claims**



1. A method for cutting the seal positioned around a vehicle window between the inside surface of the window and the vehicle structure, said method comprising the steps of:

(a) providing a flexible elongated power transmission member having a first end and a second end, the second end including a cutting portion adapted for cutting the seal between the window and the vehicle structure;

(b) completely encasing the power transmission member with a slightly curved sheath over substantially its entire length, the sheath having an open end through which the cutting portion of the power transmission member is adapted to extend a desired cutting distance;

(c) inserting the open end of the sheath, along with the substantially covered power, transmission member into the space between the inner surface of the window and the vehicle structure to the seal; and

(d) reciprocating the power transmission member in the sheath so that the cutting portion of power transmission member reciprocates back and forth out of the open end of the sheath to the desired cutting distance to cut the seal without substantially damaging the vehicle structure adjacent the window.

4,955,125

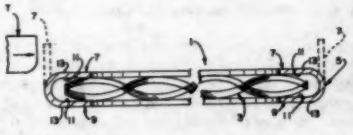
METHOD OF FORMING A PIZZA GRILL

Gerald W. Steinman, 417 Runnymede, St. Louis, Mo. 63141

Filed Dec. 26, 1989, Ser. No. 456,461

Int. Cl.[5] B21D *39/02*; A47J *27/00, 36/00*; A21B *3/13*

U.S. Cl. 29—509 **8 Claims**



1. The method of forming a pizza supporting and baking grid structure with a circumferentially continuous supporting rim, comprising the steps of:

forming a one-piece generally flat annular rim section with an integral generally upstanding annular rim section,

forming a complementary configured self-supporting metal screen having a pre-configured outer periphery for complementary association relative to said generally flat and upstanding annular rim sections,

assembling said screen relative to said annular rim sections with its outer periphery resting upon the generally flat annular rim section, and

thereafter re-shaping by spin processing said upstanding annular rim section into generally opposed and parallel relationship to said generally flat rim section so as to capture said screen therebetween.

4,955,126

PROCESS FOR FUSING STEEL SLABS IN LONGITUDINAL DIRECTION THEREOF

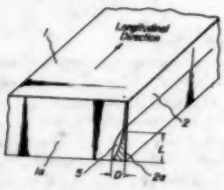
Masaru Shibata; Masayuki Onishi; Hitoshi Ohsugi; Shigeru Ogura; Masaru Washio; Hideo Kuguminato, and Yoshiaki Hara, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Apr. 20, 1989, Ser. No. 341,142

Claims priority, application Japan, Apr. 26, 1988, 63-101467

Int. Cl.[5] B23P *17/00*

U.S. Cl. 29—527.6 **4 Claims**



1. A process for cutting a steel slab being continuously cast, comprising the steps of:

(1) maintaining said slab at a temperature more than 500° C.,

(2) torch cutting the slab in a longitudinal direction at a speed more than 300 mm/minute such that at least a surface portion is fused, and

(3) removing at least a lower portion of the longitudinally cut fused surface portion of the slab.

4,955,127

AUTOMATIC TOOL EXCHANGING DEVICE FOR A MACHINE TOOL

Nobuyuki Suda; Akihiko Fujimoto, and Ryuji Suzuki, all of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP88/00784, § 371 Date Apr. 6, 1989, § 102(e) Date Apr. 6, 1989, PCT Pub. No. WO89/01387, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 8, 1988, Ser. No. 360,915

Claims priority, application Japan, Oct. 8, 1987, 62-198284

Int. Cl.[5] B23Q *3/157*

U.S. Cl. 29—568 **5 Claims**

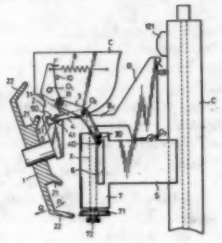
1. An automatic tool exchanging device for a machine tool, comprising:

a magazine supporting member (2) supporting a magazine (1) at the lower end thereof and pivotally mounted to a support by means permitting the magazine supporting member (2) to swing back and forth;

an elastic member (8) having one end attached to the upper end of the magazine supporting member (2) and pulling the upper end of the magazine supporting member (2) in one direction;

a stopper block (5, 5') attached to the magazine supporting member (2); and

a stopper (4, 4', 11) engaging with the stopper block (5, 5', 11) upon arrival of the magazine (1) at a standby position



from a tool exchanging position, to prevent vibration of the magazine (1).

4,955,128

METHOD FOR INSERTING ROTOR OF ELECTRIC MOTOR

Masatoyo Sogabe, and Kazushi Kumagai, both of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

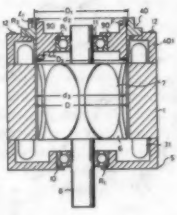
PCT No. PCT/JP88/00100, § 371 Date Oct. 3, 1988, § 102(e) Date Oct. 3, 1988, PCT Pub. No. WO88/06373, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 4, 1988, Ser. No. 265,866

Claims priority, application Japan, Feb. 17, 1987, 62-032479

Int. Cl.[5] H02K *15/16*

U.S. Cl. 29—596 **2 Claims**



1. A method for inserting a rotor, having a rotor shaft, of an electric motor into a stator from a first end portion to a second end portion of said stator, comprising the steps of:

centering and guiding a first end portion of said rotor by a first guide tool having an inclined face which is in turn attached to said first end portion of said stator cooperating with a second guide tool attached to a rear end portion of said rotor shaft during initial insertion of said rotor into said stator, said rotor having a magnet which is easily chipped and being arranged on a peripheral face of said rotor to thereby prevent said first end portion of said rotor from being damaged by said first end portion of said stator;

guiding a second end portion of said rotor within said stator by guiding a front end portion of a rotor shaft by a front bearing attached to said second end portion of said stator, and by guiding a rear end portion of said rotor shaft by said first guide tool attached to said first end portion of said stator cooperating with said second guide tool attached to a rear end portion of said rotor to thereby prevent said first end portion of said rotor from being damaged by the inner surface of said stator and to thereby prevent said rotor peripheral face from being damaged by said first end portion of said stator; and

removing said first and second guide tools from said first end

portion of the stator and said rear end portion of the rotor shaft, respectively.

4,955,129

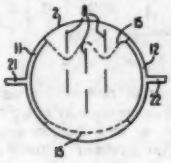
METHOD OF MAKING AN INTEGRAL HEATER FOR COMPOSITE STRUCTURE

Donald D. McCauley, Los Altos Hills, and John D. Bayless, Jr., Cupertino, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Division of Ser. No. 303,071, Jan. 30, 1989, which is a continuation of Ser. No. 92,844, Sep. 3, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,196

Int. Cl.[5] H05B *3/00*

U.S. Cl. 29—611 1 Claim



1. A method for making a heater for a composite structure comprising a layer of a multitude of lossy electrically conductive elongated fibers embedded in an electrically nonconductive matrix, said fibers and said matrix synergistically contributing to the strength of said composite structure, said heater comprising:

means for injecting an electrical current through multiple paths of the conductive fibers, whereby the fibers convert the electrical current to heat energy; wherein

the fibers are from the group of materials comprising felt mats and closely woven fabrics;

the fibers provide structural support tot he composite structure by virtue of being an integral part thereof, as well as act as heat converters; and

said heater is designed to provide nonuniform heating to the composite structure;

said method comprising the performance of at least one of the following two steps:

increasing the thickness of the layer of conductive fibers in regions where it is desired to produce more heating; and

cutting slits into the composite structure in order to make nonuniform the current densities through the multiple paths, whereby the presence of slits results in a decrease in the amount of heat produced.

4,955,130

FEEDER BLADE REPLACEMENT APPARATUS POR COIL INSERTER TOOLING

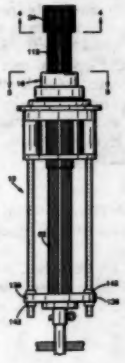
Cedric L. Bricker, Fort Wayne; Timothy K. Pease, Kendallville, and Donald L. Kammeyer, Woodburn, all of Ind., assignors to Pease Windamatic Systems, Inc., Fort Wayne, Ind.

Filed Jan. 29, 1990, Ser. No. 471,641

Int. Cl.[5] H02K *15/10*

U.S. Cl. 29—734 5 Claims

1. In an apparatus for inserting coil side portions and coil side retaining wedges into axially extending slots of a magnetic core and including a circular array of coil turn feeder blades for receiving a plurality of electrical coils into said slots, stripper means for moving said coils from said coil blades into said core in positions with side turn portions thereof disposed in said slots, a circular array of wedge guide blades for guiding a plurality of slot wedges into said slots to cover said side turn portions in said slots, each slot wedge being guided between circumferentially adjacent wedge guide blades and each coil turn feeder blade being radially inwardly of and in face-to-face radial apposition with its own one of said wedge guide blades in said circular array, in combination therewith the improvement comprising support ring means including detent means for retaining each feeder blade against axial movement relative to said support ring means when said feeder blade is in an operating position, means for retaining each wedge guide blade in said face-to-face radial apposition with its own one of said coil turn feeder blades to thereby prevent disengagement of said detent means, said means for retaining including means for supporting and restraining one end of each wedge guide blade against radial displacement and including collet means having a first surface for restraining an intermediate portion of each wedge guide blade against axial and radial displacement, said



collet means having a second surface facing and spaced from each wedge guide blade and defining a clearance zone, releasable fastening means holding said first surface of said collet means in contact with said intermediate portion, whereby said feeder blades and said guide blades may be removed and replaced by releasing said fastening means, moving said first surface of said collet means out of contact with said intermediate portion, axially and then radially displacing said one end of a wedge guide blade within said clearance zone, radially displacing a feeder blade to release said detent means from its axially retaining condition and axially removing the said feeder blade from said circular array of feeder blades.

4,955,131

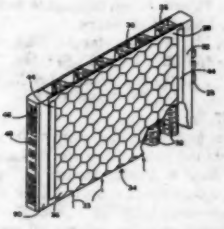
METHOD OF BUILDING A VARIETY OF COMPLEX HIGH PERFORMANCE IC DEVICES

Louis Edmond Chall, Jr., Costa Mesa, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Division of Ser. No. 118,362, Nov. 6, 1987, Pat. No. 4,858,072. This application May 30, 1989, Ser. No. 358,316

Int. Cl.[5] H05K *3/36*

U.S. Cl. 29—830 3 Claims



1. A method of building a variety of complex high-perfor-

mance integrated circuit devices from a small selection of standardizable components, comprising the steps of:

(a) assembling plurality of substantially identical chip carriers adjacent to each other onto a common substrate to form a mosaic; wherein each of said carriers comprises:

connection pads so arranged on the periphery of said carrier that each connection pad, except for those connection pads on the periphery of the mosaic, is immediately adjacent to a corresponding connection pad of another carrier of the mosaic; and

a software-configurable integrated circuit chip mounted on said carrier; wherein:

said chips, carriers, and mosaic are so configured as to allow each chip to selectively transmit and receive data through said connection pads to and from a chip on any adjacent carrier in said mosaic; and

immediately adjacent ones of said connection pads are electrically connected to each other without the use of intervening wires or leads; and

(b) configuring said chips by electronic signals to form a very large scale integrated circuit.

4,955,132

METHOD FOR MOUNTING A SEMICONDUCTOR CHIP

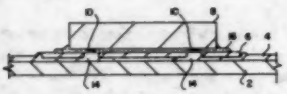
Kazuhito Ozawa, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 15, 1988, Ser. No. 271,256

Claims priority, application Japan, Nov. 16, 1987, 62-288788

Int. Cl.[5] H05K *3/34*

U.S. Cl. 29—840 **8 Claims**



1. A method for mounting a semiconductor chip on a circuit board, which comprises:

forming a wiring pattern, which is to be connected with electrodes of the semiconductor chip, on the circuit board;

attaching an insulating film, which has at least one hole that fits the shape of said electrodes of the semiconductor chip, to the top of said wiring pattern and the exposed portion of said circuit board;

filling said hole formed in said insulating film with a conductor; and

placing said semiconductor chip on said insulating film and connecting electrodes of the semiconductor chip electrically with said wiring pattern on the circuit board through said conductor by use of a conductive adhesive agent.

4,955,133

METHOD OF MAKING PULLEYS WITH PLURAL V-SHAPED GROOVES

Haruna Tanaka, Fujimi, Japan, assignor to Sanshu Press Industry Company, Ltd., Tokyo, Japan

Division of Ser. No. 198,109, May 24, 1988, abandoned. This application Mar. 10, 1989, Ser. No. 321,859

Claims priority, application Japan, May 28, 1987, 130032/87

Int. Cl.[5] B21K *1/42*

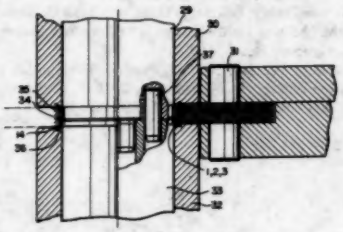
U.S. Cl. 29—892.3 **1 Claim**

1. A method of making a pulley with a plurality of V-shaped grooves, wherein the pulley has a rim including one or more rim formations fixed to a core, comprising the steps of

(a) punching a core blank to form a core member having a selected core shape including a generally cylindrical outer surface having serrations facing outwardly therefrom,

(b) processing a rim blank having a smooth outer surface and inner surface to form a rim member having a rim formation formed therein, wherein the rim formation has an inner surface including rim serrations and an outer surface,

(c) rolling a roll against the rim formation to form a plurality of outwardly facing V-shaped grooves on the outer surface of the rim formation; and



(d) simultaneously with said rolling step, fixing the rim member to the core member by interfitting the serrations on the core member with the rim serrations of the rim formation under the action of the force used in said rolling step.

4,955,134

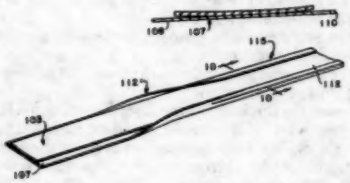
METHOD OF FORMING A SPRING-LIKE FIRE STRIP

William J. Platt, Aston, Pa., assignor to National Rolling Mills, Inc., Frazer, Pa.

Division of Ser. No. 375,567, Jul. 3, 1989, Pat. No. 4,916,877, which is a continuation-in-part of Ser. No. 269,921, Nov. 10, 1988, Pat. No. 4,864,791. This application Oct. 30, 1989, Ser. No. 429,115

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—897.312 **4 Claims**



1. The method of making a fire strip, including a strip body, having an under side and an upper side, and first and second ends, for a grid ceiling for supporting panels, and having

(a) an inner web of spring steel on the upper side of the strip and having a preformed arcuate cross section extending concavely upwardly, and having a top, a bottom, and side edges,

(b) an outer web of soft steel disposed at said bottom of the inner web on the under side of the strip and having edge portions wrapped around the side edges of the inner web and bent to lie along the top of the inner web,

(c) end portions at both ends of the strip bent upwardly substantially normal to the strip body, and

(d) fastening means on said end portions for securing the ends of the strip to grid members;

wherein the body of the strip has an upwardly extending, spring-like, yieldable arch; comprising

(a) continuously forming the inner web from a flat and rectangular cross section into said arcuate cross section,

(b) continuously wrapping and bending the outer web around the inner web thereby forming a continuous strip,

(c) cutting the resultant continuous strip into given strip lengths, and

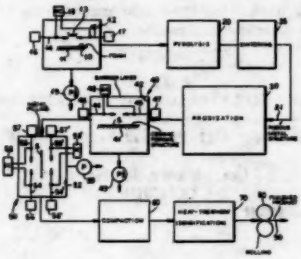
(d) bending portions of the strip lengths at both ends normal to the strip to form an upwardly extending, yieldable, spring-like arch.

4,955,135

METHOD OF MAKING MATRIX COMPOSITES

Eduard Plakhasov, Eastchester, N.Y., assignor to Vapor Technologies Inc., Mt. Vernon, N.Y.

Filed Nov. 16, 1988, Ser. No. 272,557
Int. Cl.[5] B23P *17/00*
U.S. Cl. 29—527.2 18 Claims



1. A method of making a matrix composite which comprises the steps of:

(a) coating interstitial and external walls of a synthetic resin foax material with a first substance resistant to heat so as to form a body with a continuous network from said first substance;

(b) pyrolyzing said synthetic resin foam material of said body to substantially completely remove said synthetic resin material to leave a porous structure substantially free from interfaces between strands of said structure and constituted by said network;

(c) depositing a second substance in pores of said structure to substantially fill the same and form a matrix phase in which said porous structure is embedded; and

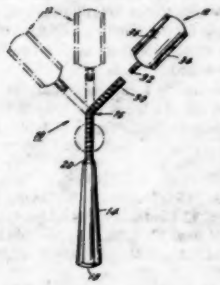
(d) compacting the structure filled with the matrix phase to form the matrix composite.

4,955,136

SHAVING APPARATUS

Jose E. Diaz-Rivera, Calle Amapola, 75 La Ponderosa, Rio Grande, P.R. 00745

Filed Oct. 24, 1988, Ser. No. 261,566
Int. Cl.[5] B26B *21/00*
U.S. Cl. 30—32 15 Claims



1. A shaving apparatus comprising:

a handle;

a bendable, nonresilient section connected at one end to the handle, said bendable section comprising a plurality of interlocking, circular elements each having an S-shaped cross-sectional wall; and

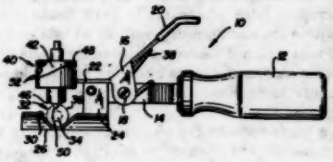
a blade unit connected to another end of the bendable section, the bendable section being bendable by the user of the shaving apparatus to cause the blade unit to be oriented at a desired angle with respect to the handle thereby providing a desired handle angle for the user.

4,955,137

MECHANISM FOR ADJUSTING DEPTH OF CUT ON WIRE AND CABLE JACKETS

James J. Matthews, East Haddam, Conn., assignor to Ripley Company, Inc., Cromwell, Conn.

Filed Mar. 6, 1989, Ser. No. 320,278
Int. Cl.[5] B21F *13/00*; B26B *27/00*
U.S. Cl. 30—90.1 26 Claims



1. A tool for stripping jacket from cable comprising:

means for holding a portion of said cable; and

means for clamping said cable against said holding means and cutting said jackets,

said clamping and cutting means including a surface for bearing against the exterior of the jacket on said cable and a cutter member for cutting said jacket, said cutter member being secured on a central member extending above an adjustment knob and adjustable by rotation of said knob toward and away from said cable to vary the depth of cut of the jacket of the cable held in the holding means, said central member being removably secured by screw means for replacement of said cutter member.

4,955,138

UTILITY BLADE SCRAPER

David R. Henke, Maple Grove, and Steven L. Thompson, Buffalo, both of Minn., assignors to Warner Manufacturing Company, Minneapolis, Minn.

Filed Jan. 13, 1989, Ser. No. 297,414
Int. Cl.[5] A47L *13/04*; B26B *29/02*
U.S. Cl. 30—169 16 Claims

1. A blade scraping tool used with a utility knife blade, comprising:

(a) a handle having top and bottom surfaces and including a blade housing portion having top, bottom and side surfaces, the blade housing portion being proximate a front end of the blade scraping tool and being adapted to re-

ceive a utility knife blade, the blade housing portion including diverging inner side surfaces diverging away from each other toward a front end of the blade housing portion;

(b) trigger means slidably mounted in the blade housing portion intermediate of the top and bottom surfaces of the blade housing portion for slidably moving a utility knife blade into and out of the front end of the blade housing portion of the handle, a utility knife blade being mountable on the trigger means and slidably movable therewith, the utility knife blade being mounted on the trigger means with its scraping edge extending substantially perpendicular to a longitudinal axis of the blade scraping tool, the trigger means including:

(i) lever means accessible from outside the blade housing portion cooperating with the blade housing portion for locking the trigger means in at least three different locking positions and for slidably moving the trigger means into and out of the locking positions, the locking positions including a storage position in which the scraping edge of the utility knife blade is contained within the blade housing portion, a blade scraping position in which the scraping edge of the utility knife blade is exposed, and a blade changing position in which the utility knife blade may be removed from the trigger means;

(ii) a blade mounting surface area in front of the lever means adapted to receive a utility knife blade, the blade mounting surface area including projection means for preventing forward or backward movement of the utility knife blade relative to the blade mounting surface;

(c) wherein the blade housing portion includes at least one track means for supporting the trigger means while it is slidably mounted in the blade housing portion.

4,955,139

CUTTING TOOLS HAVING A PLASTIC HANDLE

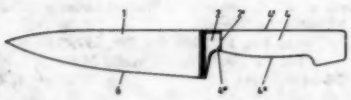
Wilfried Clotten, Langenfeld, and Rainer Feige, Wermelskirchen, both of Fed. Rep. of Germany, assignors to J. A. Henckels Zwillingswerk Aktiengesellschaft, Solingen, Fed. Rep. of Germany

Filed Apr. 25, 1988, Ser. No. 185,531

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1987, 3713958

Int. Cl.[5] B25G *1/00*

U.S. Cl. 30—340 **6 Claims**



1. A cutting tool, particularly a knife, comprising

a handle;

blade means, the blade means including an attachment section rearward of the blade means; and wherein

the handle includes an insertion shaft for receiving the attachment section with a snug connection between said blade means and said handle, the insertion shaft being configured with a cross-section of wide and narrow sides, and having cross-sectional widenings, extending longitudinally on opposite wide sides of the shaft, inner surfaces of said widenings being spaced from said attachment section;

the handle comprises, on an end surface facing the blade means, freestanding lugs located in registration with corresponding cross-sectional widenings, the lugs converging towards each other in a generally forward direction of the attachment section and being inclined relative to a longitudinal axis of the handle; and wherein

an inside distance between ends of the lugs is at least as great as a width of the attachment section, the length of each lug being greater than a spacing between the attachment section and an inner surface of the insertion shaft; and

a forward end of said attachment section extends in width beyond said inside distance for engagement with said lugs to increase convergence of said lugs into locking engagement with said attachment section upon insertion of said attachment section into said shaft, said locking engagement bending said lugs in a direction perpendicular to said attachment section and introducing a longitudinal compression to each lug for a tight grip between said attachment section and said handle.

4,955,140

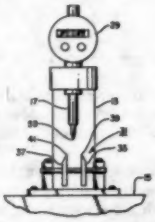
DEVICE FOR MEASURING THREAD MINOR DIAMETER

Joe E. Greenslade, 4311 Pheasant Walk, Fort Worth, Tex. 76133

Filed Oct. 26, 1989, Ser. No. 427,455

Int. Cl.[5] G01B *3/40*

U.S. Cl. 33—199 R **7 Claims**



1. A device for measuring the minor diameter of a screw thread on a screw having a longitudinal axis, the device comprising:

a frame;

first locator means carried by the frame for engaging a thread root at a first axial location along the screw;

second cooperating locator means arranged on the frame oppositely to the first locator means for holding the screw therebetween, the second cooperating locator means having a pair of engagement elements which engage the screw thread root at spaced locations along the longitudinal axis of the screw;

mounting means for mounting the second cooperating locator means on the frame, whereby the engagement elements thereof are independently movable along an axis generally parallel to the longitudinal axis of the screw,

indicating means for determining a relative distance between the first and second locator means when the screw is held therebetween; and

wherein the mounting means is a shaft fixed on the frame generally parallel to the screw longitudinal axis, the engagement elements being freely slidable along the shaft.

4,955,141

ADJUSTABLE PIVOT ANGLE SQUARE INVENTION

Richard E. Welch, 12 Centre Ave., Rockland, Mass. 02370

Filed Sep. 20, 1988, Ser. No. 246,988

Int. Cl.[5] B43L *7/00*; G01C *9/00*

U.S. Cl. 33—418 **5 Claims**

1. An adjustable pivot angle square comprising a base blade, a travel blade and an angle blade wherein:

A. said base blades, said travel blade and said angle blade are

separate, flat, elongated, rectangular members, pivotally interconnected by a rotating means;

B. said travel blade has a top end and an lower end oppositely disposed from said top end;

C. said angle blade has a lower end and an upper end oppositely disposed from said lower end;

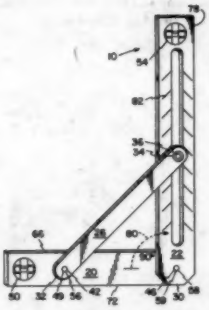
D. said base blade has a straight end and an angled end oppositely disposed from said straight end;

E. a pivotal means connects said travel blade lower end to said base blade at said base blade angled end in a pivotal relationship;

F. said travel blade has a travel slot extending through the center of said travel blade substantially the length of said travel blade elongation allowing full rotation of said travel blade;

G. a movable means slidably connects said angle blade upper end to said travel slot;

H. a rotatable means connects said angle blade lower end to said base blade at a point disposed closer to said base blade straight end than said base blade angled end;



I. a movable means connects said travel blade upper end to said travel slot by a combination of a travel blade lock bolt mechanism and a travel slot pivot pin mechanism cooperating together;

J. a slidable means rotatably connects said angle blade upper end and travel blade slot;

K. a pivotal means allows said angle blade lower end to rotate on said base blade allowing said angle blade pivotal movement necessary for said travel blade to rotate smoothly clockwise or counter clockwise;

L. said travel blade lock bolt mechanism and said travel slot pivot pin mechanism control said base blade movement and said travel blade movement;

M. said travel blade lock bolt mechanism turns to release and to lock said travel blade, said angle blade and said base blade by pressure adjustment to the said travel slot pivot pin mechanism, whereby, the user by releasing said travel blade lock bolt mechanism, can pivot or rotate the adjustable pivot angle square to a full 360 (three hundred and sixty) degrees.

4,955,142

DECK SPACING TOOL

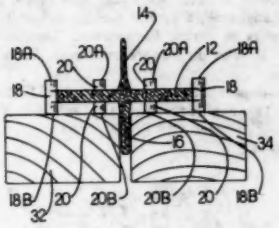
Kenneth J. Rieck, 7 Olde Orchard Ln., Fairport, N.Y. 14450

Filed Sep. 6, 1989, Ser. No. 403,476

Int. Cl.[5] G01B *3/30, 3/32*

U.S. Cl. 33—526 **11 Claims**

1. A hand tool for use in placing deck boards on a support structure, said tool being in the form of a unitized main body portion which comprises a pair of oppositely extending vertical blades suitable for placement between adjacent deck boards so as to maintain a uniform space prior to permanently fixing said deck boards in place, said blades being integrally connected to the main body portion at a base section, a pair of substantially flat generally horizontally extending stabilizing arms, integral with and extending from opposite sides of the base of said blades, each stabilizing arm having at least one spacing member on each of its flat surfaces for placement on



the top surface of the deck boards so as to provide means to facilitate removal of said hand tool and assure vertical orientation of the blade between adjacent boards.

4,955,143

APPARATUS AND METHOD FOR CONTROLLING AND ADJUSTING THE GEOMETRIC RELATIONSHIP BETWEEN ELECTRODE TIPS OF AN UNDERWATER SPARK DEVICE

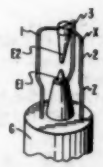
Ulrich Hagelauer, Bottighofen, Switzerland, assignor to Storz Medical AG, Kreuzlingen, Switzerland

Filed Apr. 20, 1989, Ser. No. 340,796

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3904049

Int. Cl.[5] G01B *3/30*

U.S. Cl. 33—652 **14 Claims**



1. A method for controlling and adjusting the relative position of electrodes of a spark gap device, one electrode being mounted by at least one electrode holder to a base plate, the method comprising the steps of:

engaging the at least one electrode holder; and

positioning the at least one electrode holder about an electrode axis extending between the electrodes to a nominal position at which the electrodes are properly positioned with respect to at least one of an alignment, angularity and electrode distance of tips of the electrodes, the positioning step being accomplished by bending of the at least one electrode holder.

4,955,144

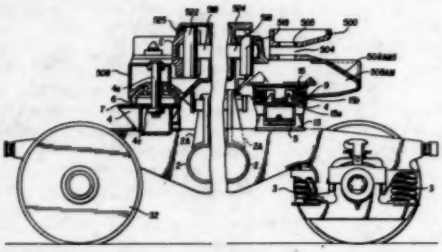
COMPATIBLE INTERMODAL ROAD/RAIL TRANSPORTATION SYSTEM

Jean Liesard, Ferriere la Petite; Francis Haesebrouck, Versailles, both of France; Sol Katz, New Hope, Pa.; Andrew Abolins, Langhorne, Pa., and George Schmidt, Langhorne, Pa., assignors to Strick Corporation, Langhorne, Pa. and Usines et Acieries de Sambre et Meuse, Paris la Defense, France

Continuation-in-part of Ser. No. 147,361, Jan. 27, 1988, Pat. No. 4,922,832. This application Jun. 14, 1988, Ser. No. 207,109

Int. Cl.[5] B61D *17/20*

U.S. Cl. 105—4.2 **5 Claims**



1. A bogie intended to be placed between the ends of two road trailers at least one of which has a drawbar extending from a longitudinal end thereof, the bogie including a rigid chassis having first and second ends mounted on rail wheels, said first and second ends of said chassis having first and second supports, respectively, to accommodate an end of a supported member, said first support supporting a first supported member and said second support supporting a second supported member, said first support including means to attach said supported member to said support in a removable manner, said first supported member comprising a freight container and said second supported member comprising an adapter bolster, said adapter bolster comprising a drawbar receiving opening and means for retaining the drawbar of the road trailer in said opening and each of said first and second supports being connected to the chassis by fastening means allowing a predetermined freedom of movement of the supports with respect to the chassis around the following three axes: the axis perpendicular to the horizontal plane of the chassis, the axis parallel to the longitudinal axis of the chassis and the axis perpendicular to the vertical longitudinal plane of symmetry of the chassis.

4,955,145

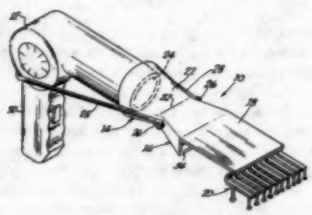
HAIR DRYER ATTACHMENT

Joseph C. Scivoletto, Coral Springs, Fla., assignor to Lisa Maria Scivoletto, Coral Springs, Fla.

Filed Sep. 11, 1986, Ser. No. 906,171

Int. Cl.[5] F26B *21/06*

U.S. Cl. 132—271 **20 Claims**



1. An attachment for a blow dryer comprising:

a plurality of picks, each extending from said attachment and having an end remote from said attachment;

hair catching means having one end thereof attached to said remote end of each of said picks, said hair catching means having a hair catching surface facing away from the other end thereof;

means for directing air emitted by said blow dryer towards said hair catching means; and

means for attaching said attachment to said blow dryer.

4,955,146

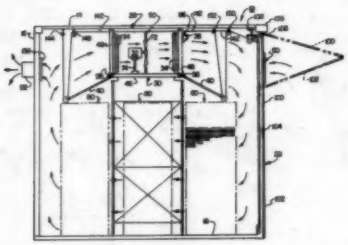
LUMBER DRYING KILN

Howard E. Bollinger, Lenoir, N.C., assignor to Boldesigns, Inc., Lenoir, N.C.

Filed Sep. 1, 1988, Ser. No. 239,549

Int. Cl.[5] F26B *21/06*

U.S. Cl. 34—191 **2 Claims**



1. A kiln for seasoning lumber, comprising:

(a) a housing defining a drying chamber and having opposed side walls;

(b) a top wall forming a roof;

(c) an end wall;

(d) closure means opposite said end wall for permitting lumber to be inserted within and removed from said chamber;

(e) an air treatment and circulating assembly adjacent said top wall, said air treatment and circulating assembly including a series of fan assemblies for circulating air to the lumber stacked within said chamber and means for heating air within said chamber;

(f) a power-operated exhaust venting system located on the downstream side of the airflow from the lumber stack and on the upstream side of said air treatment and circulating assembly, said exhaust venting system being operable to exhaust moisture-laden wet air prior to the air passing through said air treatment and circulating system; and

(g) an intake air vent located downstream of the air flow from said air treatment and circulating assembly and upstream of the stacked lumber, said air vent being operable to add additional outside air to make up that portion of air which is exhausted through said exhaust venting system, whereby the flow of air circulated through the lumber stacked within said chamber remains substantially constant, wherein said air treatment and circulating assembly and said power-operated venting system are reversible, whereby said power-operated venting system is operable to add additional outside air and said air vent is operable to exhaust the moisture-laden air prior to the air passing through said air treatment and circulating assembly.

4,955,147

SHOE, SANDAL OR SIMILAR FOOTWEAR

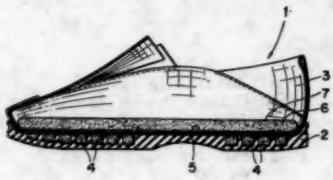
Louis Bos, Hogewerf 108, 1082 NG Amsterdam, Netherlands

Filed Dec. 16, 1988, Ser. No. 285,760

Claims priority, application Netherlands, Dec. 29, 1987, 8703146

Int. Cl.[5] A43B 3/12

U.S. Cl. 36—11.5 5 Claims



1. Footwear provided with a sole having a wear layer, and with means for binding to the foot, characterized in that the side of the sole facing the foot is flat, and is provided with an also flat layer of highly springy elastic material, said highly springy elastic material being characterized by a high elastic recovery capacity such that said layer of said highly springy elastic material provides increasing support as said layer is depressed further by the weight of said foot and wherein said layer of said highly springy elastic material instantaneously returns to a flat layer upon removal of the weight of said foot wherein said flat layer of said highly springy elastic material is further characterized by not being pre-shaped along a vertical plane to conform to the plantar surface of said foot.

4,955,148

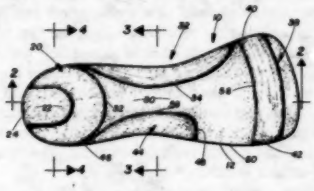
FOOT SUPPORT ASSEMBLY

Rigoberto Padilla, 801 W. 48th St., Hialeah, Fla. 33012

Filed Apr. 14, 1989, Ser. No. 338,187

Int. Cl.[5] A43B 13/38; A61F 5/14

U.S. Cl. 36—44 6 Claims



1. Any foot support assembly designed for placement within a shoe in supporting engagement with the bottom of a foot, said assembly comprising:

a. a support platform formed of a resilient cushion material and having a first main face and a second main face, said first main face structured and configured to engage predetermined portions of the undersigned of the foot,

b. a heel support formed on a posterior end of said first main face and having an elongated substantially curvilinear horse shoe configuration extending along its length in surrounding relation to a recessed central elongated channel having an open end disposed adjacent to said posterior end, said heel support positioned beneath an engaging relation to the heel of the foot,

c. an arch support formed on an inner edge of said first main face having a curved configuration in substantial conformance with an arc portion of the foot and having sufficient length to extend along at least a major portion of the length of the arch of the foot,

d. an external side support formed on an outer edge of said first main face having an elongated configuration oppositely disposed relative to said arch support and extending along an external side portion of the foot in supporting, engaging relation thereto,

e. a metatarsal support formed on an upper end of said first main face opposite to said heel support and having an elongated arcuate configuration of substantially uniform width extending transversely across said first main face in supporting relation to the metatarsal region of the foot, said metatarsal foot having opposite ends thereof disposed adjacent to correspondingly positioned opposite sides of the support platform,

f. a recessed portion on said first main face interconnecting and extending between said supports, and

g. said supports extending above said recessed portion to a sufficiently greater height to accomplish supporting engagement with a corresponding under surface portion of the foot.

4,955,149

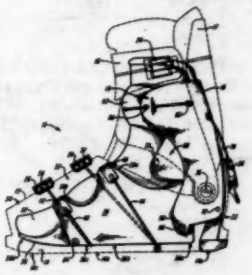
SKI BOOT WITH ANKLE SUPPORT

Marco T. Ottieri, 15 W. 53rd St., Apt. 15C, New York, N.Y. 10019

Filed Nov. 22, 1988, Ser. No. 275,117

Int. Cl.[5] A43B 5/04, 7/20

U.S. Cl. 36—119 13 Claims



1. A ski boot comprising

a substantially rigid outer shell,

a heel spoiler for selectively engaging and supporting the back of the wearer's lower leg and hingedly connected to the outer shell to facilitate pivotal movement of the spoiler between open and closed positions;

a boot liner disposed within said outer shell for comfortably seating a wearer's foot within the boot,

selectively operable closure means for securing the boot to a wearer's foot, and

ankle support means, disposed substantially interior of the outer shell, for supportingly engaging the front of wearer's foot above the malleolus to maintain the wearer's foot supportingly engaged within the boot when the boot is in the closed position.

4,955,150

IDENTIFICATION SYSTEM FOR FOOTWEAR

Nancy L. Fagan, Joy Ave., Stonington, Conn. 06378

Filed Aug. 18, 1989, Ser. No. 395,781

Int. Cl.[5] A43B 23/24; A44C 3/00

U.S. Cl. 36—136 11 Claims

1. The combination comprising:

footwear of the type having a tongue and means selectively overlying said tongue for releasably fastening said footwear to the wearer;

an identification system for placement on said footwear including:

elongated tubular member of pliable, liquid impermeable material defining an internal compartment capable of receiving and holding items of importance to the wearer of said footwear;

entry means at one end of said tubular member for providing access to the internal compartment;

closure means for selectively sealing said entry means to isolate the internal compartment from ambient conditions

and substantially prevent entry therein of water and other substances; and

primary pressure sensitive mounting means for releasably attaching said tubular member to said tongue;

said tubular member being intimately positioned intermediate said tongue and said fastening means of said footwear thereby preventing unintended removal thereof when said footwear is in its operative condition.

4,955,151

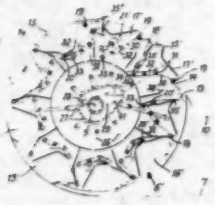
BUCKET WHEEL WITH OVERHEAD DISCHARGE

John F. Bryan, Dallas, Tex., assignor to Krupp Industrietechnik GmbH, Duisburg, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,713

Int. Cl.[5] E02F *3/24*

U.S. Cl. 37—190 **12 Claims**



1. In an excavating bucket wheel having a rotary axis; an outer periphery; a plurality of radially outwardly open bucket chambers disposed in a circular array about the rotary axis; during rotation of the bucket wheel each chamber assuming a material receiving position and a material dumping position circumferentially spaced along said periphery from said material receiving position; each bucket chamber being defined by a cutting plate supported at said periphery and having a trailing edge as viewed in the direction of rotation; two axially spaced, parallel side walls, a rear wall extending axially between the side walls; said rear wall having an inner edge and an outer edge; said inner edge being closer to the rotary axis than said outer edge; the outer edge being situated adjacent said cutting plate; and a bottom wall extending axially between the side walls and being supported for pivotal motion about an axis oriented parallel to said rotary axis of said bucket wheel and being situated adjacent said outer periphery; said bottom wall having a first pivotal position for receiving material and a second pivotal position for dumping material; said bottom wall further having an outer terminal edge; and first actuating means for pivoting said bottom wall; the improvement comprising pivot means for pivotally supporting each said rear wall, at the inner edge thereof, about an axis oriented parallel with the rotary axis of said bucket wheel; and second actuating means for urging each said rear wall into contact with the outer terminal edge of a respective said bottom wall.

4,955,152

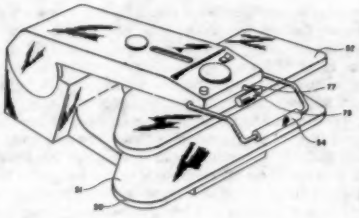
STEAM IRONING PRESS

Donald R. Davidson, Chatham; Pao-Ter Huang, Edison, and H. David Rogers, Fanwood, all of N.J., assignors to SSMC Inc., Edison, N.J.

Filed Jul. 31, 1989, Ser. No. 388,125

Int. Cl.[5] D06F *71/34*

U.S. Cl. 38—36 **5 Claims**



1. A steam iron press adapted to press an article of fabric and comprising:

first and second generally horizontal members, the first member being fixed in position and having an exposed upper surface, the second member having an exposed lower surface and being movable toward and away from the first member so that the exposed lower surface is moved toward and away from the exposed upper surface, the second member including a first heat conducting flat horizontal plate containing spaced orifices and having at least one opening for receiving water, the first plate having at least one cut out channel connected between said opening and said orifices, the second member also including a second flat conducting plate aligned with and disposed below the first plate and containing orifices which are aligned with the orifices in the first plate, the lower surface of the second plate constituting the lower surface of the second member;

the pressing action ensuing when the second member is moved toward the first member until the article is squeezed between the two exposed surfaces;

a manually operated mechanism connected to the second member for moving the second member to any position between a position of maximum separation and a position of minimum separation with respect to the first member;

first means in the second member for heating water supplied through said opening in the first plate for heating such water into steam, the steam being expelled through said orifices, said means also heating said exposed lower surface so that when said article is squeezed, it is pressed using heat and steam;

a water reservoir containing water;

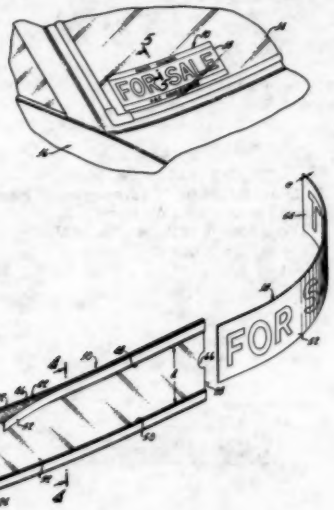
a pump connected between the reservoir and the opening in the first plate to supply water thereto when actuated, the water flow into said opening being discontinued when the pump is deactuated; and

second means responsive to said mechanism to actuate and deactuate said pump.

4,955,153
DISPLAY SIGN HOLDER AND DISPLAY SIGN THEREFOR

Leonard N. Albrecht, Irvine, and Steven R. Burke, Huntington Beach, both of Calif., assignors to Bruce G. McLeod, Anaheim and Allan R. Fowler, Palm Desert, both of, Calif., a part interest

Continuation of Ser. No. 73,925, Jul. 15, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,469
Int. Cl.[5] G09F *3/18*
U.S. Cl. 40—661 9 Claims



1. A semi-rigid, sleeve-type display sign holder adapted to conform and adhere to a planar or gently curved supporting surface for holding and displaying an elongated display sign removably inserted longitudinally between said holder and the supporting surface, said display sign holder comprising:

(a) a semi-rigid substantially flat sheet of optically clear plastic material of substantial thickness, said sheet having an elongated rectangular configuration, with top and bottom elongated edges extending generally parallel along the length thereof and with opposite ends edges extending transverse to the length thereof; and, said sheet also having opposite sides and upper and lower marginal areas extending longitudinally for the full length of said sheet along one side thereof respectively adjacent said top and bottom edges;

(b) means defining substantially flat, elongated upper and lower spacing structures extending respectively along said upper and lower marginal areas for the full length thereof on said one side of the sheet, said spacing structures each having an outer base surface and having a substantial thickness corresponding approximately to the thickness of said sheet, and thereby so spacing the sheet portion therebetween from any supporting surface against which the outer base surfaces of said spacing structures are placed and defining an elongated open channel of uniform depth corresponding approximately to the thickness of said flat spacing structures into which an elongated display sign may be freely inserted and retained against said supporting surface;

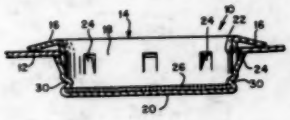
(c) an upper and lower layer of adhesive extending respectively along the outer base surface of the upper and lower spacing structure for adhering the holder to a supporting surface; and

(d) upper and lower elongated strips of protective material respectively covering said upper and lower adhesive layers, said protective strips being manually removable to expose the adhesive layers in order to adhere the holder to a supporting surface.

4,955,154
ANTI-THEFT IDENTIFICATION DETERRENT FASTENER

Nathan S. Moss, 98 Silver Lake Rd., Staten Island, N.Y. 10301

Filed Jul. 20, 1989, Ser. No. 382,387
Int. Cl.[5] G09F *3/08*
U.S. Cl. 40—663 4 Claims



1. An anti-theft identification deterrent fastener for a part which comprises:

(a) a housing having a raised flange there about, a side wall and bottom wall which will fit into the part having a corresponding cutout area;

(b) means on said side wall for locking said flange of said housing onto the cutout area of the part to prevent tampering of said housing, wherein said locking means includes a plurality of spring projections formed on a side of said sidewall and outwardly extending from said side wall below said flange so that said housing can snap into the cutout area of the part with said spring projections preventing easy removal therefrom;

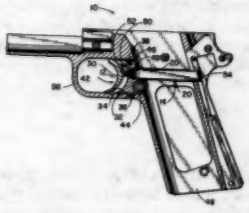
(c) an identification label affixed to said bottom wall; and

(d) means between said side wall and said bottom wall for securing said label thereto to prevent tampering of said label.

4,955,155
PIVOTING TRIGGER GROUP ASSEMBLY

Benton L. Jones, 2102 24th St. SE., Ruskin, Fla. 33570

Filed Jun. 1, 1989, Ser. No. 339,510
Int. Cl.[5] F41A *19/10*
U.S. Cl. 42—69.01 1 Claim



1. In a semi-automatic pistol having a frame, trigger frame rails, and a spring-loaded hammer, a trigger mechanism comprising a lever system including:

(1) a trigger,

(2) a pin,

(3) a support shoe,

(4) a set screw, and

(5) a stirrup,

wherein said trigger being hingedly secured to said support

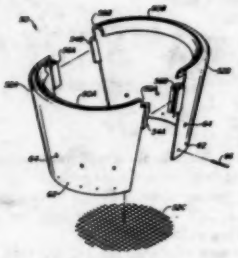
shoe by said pin, said support shoe being securely fastened within said frame of said pistol by said set screw, said stirrup slidingly located within said trigger frame rails, said trigger contacting said stirrup to produce a camming action resulting in a mechanical advantage requiring minimal force and trigger travel to actuate said hammer.

4,955,156

PLANT WATERING AND ROOT PROTECTION DEVICE

James P. Williams, One Laurel Ave., Belvedere, Calif. 94920

Filed Mar. 3, 1989, Ser. No. 318,667
Int. Cl.[5] A01G *17/00*
U.S. Cl. 47—25 **7 Claims**



1. A plant watering and protecting assembly adapted for protecting roots from underground rodents and for containing overhead water in a circumferential area above said roots for drainage into said roots, comprising a plurality of interlocking pieces adapted to removably interlock with one another to form a continuous annular sheath for underground encircling of said plant root system; each of said pieces accommodating securing means to which a solid chemical stick can be secured wherein each of said pieces is a single-molded form comprising a vertically-elongated sheet of stiff material, the upper edge of said piece comprising a curled lip wherein the degree of curling of said lip is sufficient to form an upper curvilinear edge to said piece and said curvilinear edge is adapted with a continuous groove extending along the entire length of said curvilinear edge, said curvilinear edge forming a berm for surrounding the base of a plant above ground in order to confine standing water within confines of said berm; the two vertical edges of said piece being of sufficient length to extend to an underground depth beneath the entire, or a major portion of, said root system; each of said vertical edges being adapted with interlocking engaging means for engaging and interlocking with a corresponding interlocking engaging means on a vertical edge of another of said pieces.

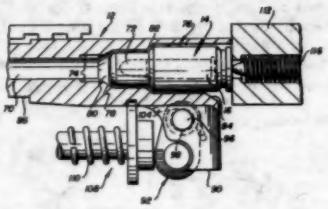
4,955,157

SMALL CALIBER AMMO CONVERSION KIT

Rich W. Brighton, 5015 S. Barton Pl., Seattle, Wash. 98118, and Paul Safr, 1657 Dale St., London, Ontario, Canada N5V 1Y3

Filed Jun. 22, 1989, Ser. No. 370,027
Int. Cl.[5] F41C *27/00*
U.S. Cl. 42—77 **20 Claims**

1. A conversion kit for converting a large caliber gun to fire smaller caliber ammo, said kit comprising an adapter barrel for replacing an original barrel of the larger caliber gun and at least one separate small caliber shell adapter for carrying small caliber ammo, said barrel having a small caliber bore terminating in a rear breech for receiving the small caliber shell adapter carrying a small caliber ammo whereby the small caliber shell adapter is insertable and removable from said breech, and there being between said breech and said small caliber bore chambering for preventing chambering of originally intended large caliber ammo.

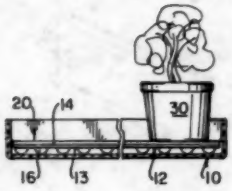


4,955,158

PLANT WATERING MAT

William E. Lyon, Westbury, N.Y., assignor to Plant Tech., Horticultural Products Inc., Westbury, N.Y.

Filed Mar. 9, 1988, Ser. No. 167,001
Int. Cl.[5] A01G *25/00*
U.S. Cl. 47—81 **10 Claims**



1. A plant watering mat for use in a tray comprising:
a first place of waterproof material having upper and lower surfaces,
a second piece of waterproof sheet material having a plurality of holes therein disposed principally unbounded over said upper surface of said first piece,
said lower surface of said first piece formed with a plurality of spaced apart downwardly projecting air cells adopted to rest on the bottom of the tray to provide with said tray a reservoir space for liquid between the cells and a support for an object placed on said second piece when the air cells of said lower surface of said first piece rest on said tray,
the liquid from the reservoir travelling in the unbounded space between the upper surface of said first piece and the lower surface of said second piece to exit through the holes to said object located on the upper surface of said second piece.

4,955,159

RETAINING CATCH FOR TIP-OUT SASH

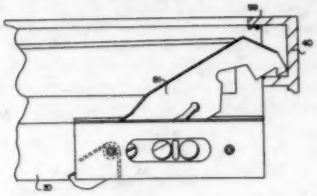
Tracy G. Rogers, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Filed Jul. 12, 1989, Ser. No. 378,969
Int. Cl.[5] E05D *15/22*
U.S. Cl. 49—161 **30 Claims**

1. A tip-out window apparatus for a sash slidable in a jamb, comprising:
at least two spaced protruding parts for mounting along an edge abutting the jamb at a slot in the jamb for receiving the protruding parts, whereby the sash is slidable in the jamb in a first, normal mode to open and close the window as the sash is maintained in a same plane with the jamb,

one of the protruding parts being a releasable latch means, the sash being released and rendered rotatable around the other of the protruding parts and out of said plane when the latch means is retracted in a second, tip-out mode; and,

a catch arm having a hook at a distal end of the catch arm, the hook being engageable in the jamb and being pivotably connected relative to the sash at a proximal end of the catch arm, the catch arm defining a maximum displacement between the jamb and the edge of the sash when the sash is released from the plane of the jamb in said tip-out mode, and the catch arm being fully releasable from the jamb by pivoting free the hook.

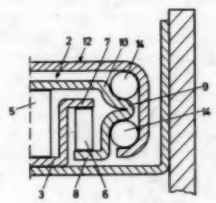


4,955,160

GUIDE WALL ASSEMBLY FOR DRAWERS

Erich Röck, Höchst, Austria, assignor to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed Aug. 11, 1989, Ser. No. 392,285
Claims priority, application Austria, Sep. 15, 1988, 2265/88
Int. Cl.[5] E04F *11/24*
U.S. Cl. 312—340 **11 Claims**



1. A guide rail assembly for use on each of opposite sides of a drawer for guiding movement of the drawer into and out of an article of furniture, said assembly comprising:

a supporting rail to be mounted on a side of the article of furniture, said supporting rail having a U-shaped guide flange defining a U-shaped channel and having outwardly projecting horizontal marginal flanges on each of opposite sides thereof;

a generally C-shaped pull-out rail embracing said guide flange of said supporting rail, said pull-out rail having on each of opposite sides thereof a generally vertical flange, a lower horizontal flange extending inwardly from a lower end of said vertical flange, and a horizontal running flange extending outwardly from said vertical flange at a position between said lower end thereof and an upper end thereof;

carriage means supporting a plurality rolling means substantially in a horizontal plane for enabling sliding movement between said pull-out rail and said supporting rail, said rolling means comprising central rolling means located in said U-shaped channel and rolling on said U-shaped guide flange and said pull-out rail and lateral rolling means, on each of opposite sides of said central rolling means, and rolling on a respective said lower horizontal flange of said pull-out rail and a respective said horizontal marginal running flange of said guide flange of said supporting rail; and

a drawer rail to be mounted on a drawer and guided for sliding movement relative to said pull-out rail by means of guide means located at each of opposite sides of said drawer rail and slidably engaging both upper and lower surfaces a respective said horizontal running flange at a respective said side of said pull-out rail;

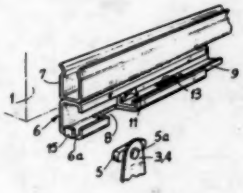
whereby the load of the drawer is transmitted from said drawer rail to said pull-out rail by said guide means and from said pull-out rail to said supporting rail by said rolling means.

4,955,161

CONNECTING DEVICE BETWEEN A WINDOW AND A WINDOW-RAISER ARM IN A VEHICLE DOOR

Carlo Bertolini, Paris, France, assignor to Rockwell-CIM, France

Filed Sep. 21, 1989, Ser. No. 410,215
Claims priority, application France, Sep. 26, 1988, 88 12541
Int. Cl.[5] E05F *11/44*
U.S. Cl. 49—351 **7 Claims**



1. A connecting device between a window and a window raiser arm (3, 4) of a door in a vehicle, the window raiser arm having a follower element (5) attached thereto, said device comprising: (a) at least one track section (6) fixed to the lower edge of the window; (b) means in said track defining an orifice (8) for introduction of the follower element (5) into said track; (c) first locking means (12, 14) spaced longitudinally apart along the length of said track; and, (d) an elongate slideway (9) disposed with said track, said slideway (9) including second locking means (11, 13), which cooperate with said first locking means (12, 14) to permit a single translational movement of said slideway (9) with respect to said track section (6) by the follower element (5) acting against said second locking means to thereby cause said first and second locking means to interact and lock said slideway in fixed position closing said orifice (8).

4,955,162

PORTABLE GEM FACETING KIT

Clifford Jackson, P.O. Box 646, Burley, Id. 83318

Filed May 19, 1989, Ser. No. 354,630
Int. Cl.[5] B24B *7/14*
U.S. Cl. 51—125.5 **15 Claims**

1. A gem faceting kit comprising:

a case having associating members adapted to operate between a closed position to constitute an enclosed and portable container carrying and storing a gem faceting machine having a removable mast and faceting head and a plurality of lap wheels, a plurality of dop sticks and a plurality of containers for grinding compounds, and an open position to constitute a rack for convenient retrieval and use of said stored items;

a gem faceting machine, including:

a housing,

an arbor mounted in said housing to spin about a vertical axis,

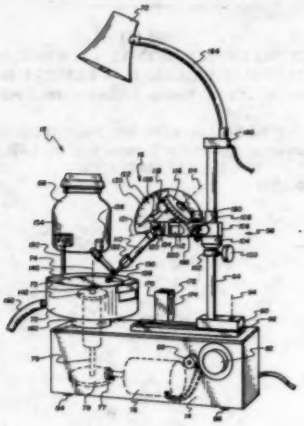
a drive unit mounted in said housing and mechanically linked to said arbor to rotate said arbor,

an upright mast and faceting head removably connected to said housing to extend upward from said housing,

a keyway having an open end attached to said housing for removably connecting said mast to said housing in an upright position,

mast storage means attached to said housing for securing said mast to said housing in a storage position reoriented from its upright position,

wherein said mast and faceting head are configured and adapted to be reoriented with respect to said housing in a compact storage position;



a plurality of lap wheels configured to be connected to said arbor;

a plurality of dop sticks formed to be fastened to a gem and connected to said faceting head;

a plurality of containers for grinding compounds;

wherein said gem faceting machine in said storage position has said mast removed from its upright position and secured to said housing in a reoriented position, said lap wheels, said dop sticks, and said containers for grinding compounds are sized, configured and adapted to be stored in said case; and

wherein said case has a plurality of storage compartments for items of said kit stored in said case.

4,955,163

METHOD FOR PRODUCTION OF INVOLUTE GEAR TOOTH FLANKS

Gerd R. Sommer, Dietlikon, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zurich, Switzerland

Filed Jun. 27, 1988, Ser. No. 212,212

Claims priority, application Switzerland, Nov. 3, 1984, 5520/84

Int. Cl.[5] B24B *19/00*

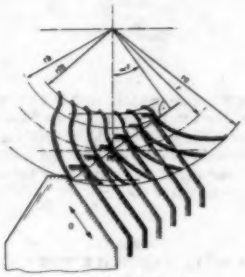
U.S. Cl. 51—287 **17 Claims**

1. A method of fabricating involute gear tooth flanks on a machine having at least one machining tool and in which method machining motions entailing stroke and operating speed of the at least one machining tool, feed motions entailing relative movements between a gear blank and the at least one machining tool for producing at least one predeterminate involute gear tooth flank, and traversing motions entailing further relative movements between the gear blank and the at least one machining tool for producing a predetermined tooth flank profile and cutting depth, between the machining tool and a gear blank are performed, comprising the steps of:

confining machining contact between said at least one machining tool and said gear blank at least to the immediate vicinity of a selectable single machining point on said at least one machining tool;

performing said feed motions such that said selectable single machining point is guided substantially along a selectable predeterminate machining line lying at least approximately on a tooth flank surface of a gear tooth of a gear being fabricated from said gear blank for generating a gear tooth flank generatrix envelope;

said step of confining machining contact entailing the step of confining said selectable single machining point within a predeterminate machining region of said at least one machining tool during machining by means of a supplementary feed motion;



said supplementary feed motion entailing the step of moving said at least one machining tool in the direction of said gear tooth flank of said gear tooth of said gear being fabricated and thereby compensating for migration of said selectable single machining point in said predeterminate machining region of said at least one machining tool during said step of performing said feed motions and during a predetermined stroke of said at least one machining tool; and

during said supplementary feed motion of said at least one machining tool, guiding said selectable single machining point substantially in tangential contact with said tooth flank surface of said gear being fabricated from said gear blank.

4,955,164

METHOD AND APPARATUS FOR DRILLING SMALL DIAMETER HOLES IN FRAGILE MATERIAL WITH HIGH VELOCITY LIQUID JET

Mohamed Hashish, Kent, and Steve Craigen, Auburn, both of Wash., assignors to Flow Research, Inc, Kent, Wash.

Filed Jun. 15, 1989, Ser. No. 367,422

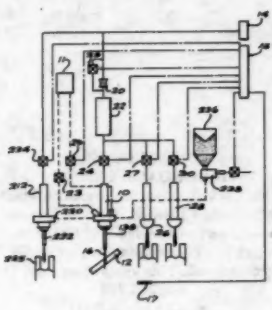
Int. Cl.[5] B24B *1/00*; B24C *9/00*

U.S. Cl. 51—321 **23 Claims**

1. A method for drilling a small diameter hole in a workpiece having at least one layer of material which tends to crack when impacted upon by a coherent high velocity jet of liquid, said material having front and back surfaces, the method comprising the steps of:

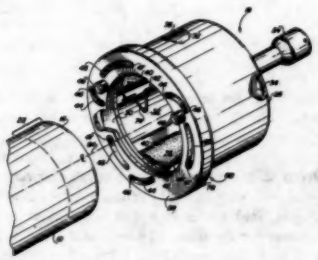
coupling a source of high pressure liquid to a jet-forming

orifice of a nozzle assembly to form a coherent, high velocity drilling jet;
discharging the jet at the workpiece; and



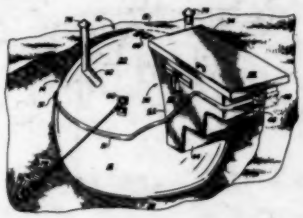
varying the pressure at at least one rate during at least a substantial portion of the drilling operation through the material.

4,955,165
PIPE TAPERING DEVICE
Harvey L. Brooks, 1302 NW. 14th St., and Tommy W. Cathey, HC 75, Box 2750-5, both of, Andrews, Tex. 79714
Filed May 4, 1989, Ser. No. 347,500
Int. Cl.[5] B24B *9/02*
U.S. Cl. 51—331 **9 Claims**



1. Apparatus for tapering the outer surface of a marginal end of a length of tubing, comprising:
an outwardly opening enclosure having a free depending end through which a tubing end can be received and an opposed end that terminates in a rear bulkhead to which a drive means can be attached; said enclosure is formed by a skirt member that is fixed to said rear bulkhead and extends therefrom and forms said outwardly opening enclosure;
a flange means rotatably mounted at said free depending end of said skirt member; cam means supported adjacent said flange means, a cam follower engaging said cam means;
a plurality of circumferentially spaced grinders; means pivotally mounting each said grinder within said enclosure for pivotal movement towards and away from the central axis of said skirt member;
means connnecting said cam means and said follower whereby rotation of said flange means in one direction respective to said skirt member moves said grinders towards the central axis of said skirt member; said grinders each are a segment of a cylinder and have a curved abrasive surface that can be pivotally moved into engagement with the end of a tubing that lies along the central axis of the skirt member to thereby grind the tubing marginal end into the form of a taper.

4,955,166
TORNADO UNDERGROUND SHELTER
Steve M. Qualline, P.O. Box 1812, Odessa, Tex. 79760, and Louis R. Dunnam, 1209 W. Cuthbert, Midland, Tex. 79701
Filed Nov. 15, 1988, Ser. No. 271,530
Int. Cl.[5] E02D *27/00*
U.S. Cl. 52—169.6 **13 Claims**



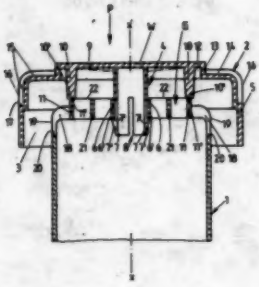
1. A generally spherical shelter for safely housing and protecting people and things underground comprising an enclosure in the form of a truncated globe formed from a curved sidewall having a vertical central axis that passes through a top and bottom surface, with there being an equatorial plane passing through the major diameter of the globe at right angles to the central axis, the bottom surface being flat and lying in a horizontal plane that is parallel to the equatorial plane and forms a floor, a seat extends about the interior of said shelter and is attached to the sidewall and to the floor and thereby forms a structural member that rigidifies said globe;
a generally rectangular entrance is formed eccentrically respective to the central axis and has opposed longitudinally extending sides extending radially through the sidewall at a location commencing near the top and extending circumferentially along the sidewall and toward the bottom; a closure member forming a door for said entrance, a plurality of steps leading from said entrance down to said floor by which a person can conveniently walk through the entrance and down the steps into and up the steps from the shelter;
wherein said rectangular entrance is formed from vertical wall members which include said longitudinal extending sides, said vertical wall members having opposed sides that terminate in opposed upper and lower edges, the lower edge is curved into attached relationship respective to said sidewall and the opposed upper edge is spaced from said sidewall to terminate in a member that defines said rectangular entrance and abuttingly receives said closure member thereagainst and thereby defines a doorway into the shelter;
the vent means attached to the top that communicates with ambient by which fresh air can be introduced into the shelter.

4,955,167
ROOF VENT PIPE
Johannes Holtgreve, Schwelm, Fed. Rep. of Germany, assignor to Hans Klöber AG, Ennepetal, Fed. Rep. of Germany
Filed Apr. 14, 1989, Ser. No. 338,875
Claims priority, application Fed. Rep. of Germany, May 7, 1988, 8806101
Int. Cl.[5] E04H *12/28*
U.S. Cl. 52—199 **12 Claims**

1. A roof vent pipe comprising
a pipe having at an upper end thereof, formed in one piece therewith, a mouth-side rib structure formed at least in part of annular spokes; and

a cover cap disposed above the spokes; and

wherein the cover cap comprises a central portion with downward directed projections, the projections including a central projection extending from the central portion and supporting fingers extending from the central portion; the cover cap is locked via said central projection to the upper pipe with said central projection of the cover cap



forming a detent member detent engaging in form-locked manner into an inside of one of said annular spokes of said rib structure; and

said supporting fingers rest on at least one further outward of said annular spokes of said rib structure and are arranged concentrically projecting from a bottom of the cover cap at said central portion.

4,955,168

MOUNTING STRUCTURE FOR ARCUATE WINDOW FRAMES

Michael Barry, Santa Ana, Calif., assignor to Daniel A. Nelhold, Orange, Calif.

Continuation of Ser. No. 365,957, Jan. 14, 1989, abandoned, which is a continuation of Ser. No. 320,756, Mar. 8, 1989, abandoned, which is a continuation of Ser. No. 183,762, Apr. 20, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 418,986

Int. Cl.[5] E06B *1/04*

U.S. Cl. 52—210 **6 Claims**

1. A device positionable of a framed wall opening to form an arcuate window jamb between a window frame mounted about the exterior of said framed wall opening and a wall board mounted about the interior of said framed wall opening, said device comprising:

an arcuate member having first and second longitudinal ends, an arcuate upper surface, an arcuate undersurface, an outer edge, and an inner edge; and

the width between the outer edge and the inner edge of the member being such that, when said member is positioned within said framed wall opening, the outer edge of the member will abut the arcuate window frame, the inner edge of the member will abut the wall board, and the arcuate undersurface of the member will form an arcuate jamb surface extending between said window frame and said wall board.

4,955,169

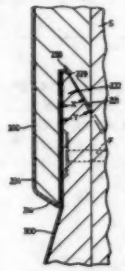
HARDBOARD SIDING

Walter S. Shisko, Corbell, Canada, assignor to MacMillan Bloedel Building Materials Limited, Weston, Canada

Continuation-in-part of Ser. No. 148,003, Jan. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 8,257, Jan. 29, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 365,777

Int. Cl.[5] E04D *1/00*

U.S. Cl. 52—536 **16 Claims**



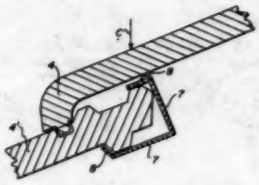
1. A siding panel for selective attachment to an underlying support surface comprising; a unitary body of hardboard material having a front face, a back face, an upper edge and a lower edge, and upper and lower marginal edge portions extending inwardly from said upper and lower edges respectively, said upper edge of said body being bevelled to provide a V-shaped locking tongue, said bevelled upper edge extending downwardly and rearwardly from adjacent said front face of the panel to said back face to thereby form a line contact which engages the underlying support surface when said body is selectively attached to the support surface, a locking seat in the form of a notch formed in the back face of said body and extendingly upwardly from said lower edge to underlay said lower marginal edge portion, said body having a uniform thickness between said upper and lower marginal edge portions which is in the range of about 0.375 to 0.5 inch, said bevelled upper edge being bevelled with respect to said front face of said body at a first acute angle and said notch being defined by a second acute angle wherein said second acute angle is greater than said first acute angle, said second acute angle being approximately 35° to 40° with said first acute angle being approximately 5° to 10° less than said second acute angle and said notch having a depth measured from said back face which is not greater than that which reduces the thickness of the lower marginal even portion to about 0.1875 inch such that when the locking tongue of one panel is seated in the locking seat of a second panel when adjacent panels are arranged with their marginal edge portions overlapping one another on the support surface, the greater thickness of said upper marginal edge will serve to space a substantial portion of said back face of said second panel from the support surface to create a drying air gap therebetween with the line contact of said one panel being adjacent said lower edge of said second panel.

4,955,170

STRUCTURES FOR ROOFS MADE OF TILES OR THE LIKE

Roberto G. C. Dannemann, Alsina 971 1°, "10"-Capital Federal, Argentina

Continuation-in-part of Ser. No. 181,317, Apr. 13, 1988. This application Jul. 7, 1989, Ser. No. 376,568
Claims priority, application Argentina, Apr. 29, 1987, 307426
Int. Cl.[5] E04D 1/34
U.S. Cl. 52—547 8 Claims



1. A roof structure, comprising:

a plurality of L-shaped purlins positioned longitudinally across the slope of a roof, said purlins having first and second legs forming said L-shape, each of said first and second legs including a respective first and second depending flange portion on a free end thereof, said first and second respective depending flange portions of each of said first and second legs defining a space therebetween; and,

a plurality of tiles each having a first and second face and an upper edge and an emerging rib located along each upper edge of each tile on said first face thereof, and a protruding tooth located on said second face of said tile, also along said upper edge thereof; wherein,

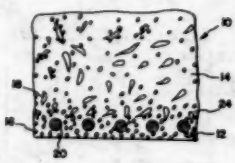
said upper edge of said tile is inserted in said space defined by said first and second depending flange portioned, and said emerging rib and protruding tooth engage said first and second depending flanges respectively, and thereby restrict removal of said tile from said L-shaped purlin.

4,955,171

BUILDING PANEL CONSTRUCTED IN LAYERS

Gert Kossatz, Brunswick; Wolfgang Heine, Osterode/Harz; Karsten Lempfer, and Heinz Sattler, both of Brunswick, all of Fed. Rep. of Germany, assignors to Fraunhofer Gesellschaft zur Forderund der Angewandten Forschung E.V., Munich, Fed. Rep. of Germany

Continuation of Ser. No. 88,430, Aug. 24, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 377,777
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629223
Int. Cl.[5] E04B 5/04
U.S. Cl. 52—612 16 Claims



1. A building panel comprising:

a first layer comprising a mixture of a hydrated binder and porous particles of a reinforcing additive capable of taking up, storing and releasing water;

a second layer comprising a reinforcing mat embedded in a hydrated binder of the same type as said first layer, said second layer being substantially without porous reinforcing additive; and

a transition layer therebetween containing hydrated binder and porous reinforcing additive of the same types, respectively, as said first layer, said transition layer forming a gradual and continuous transition in composition between said first layer containing porous reinforcing additive and said second layer substantially without porous reinforcing additive, said transition layer being formed by migration of water between one of said first and second layers poured with an excess of water for hydrating said binder and the other of said first and second layers poured with a deficiency of water for hydrating said binder;

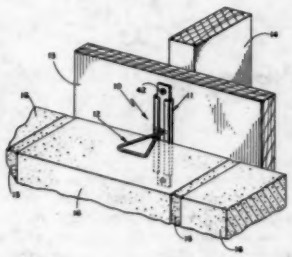
said first layer being thicker than said second layer and said transition layer being thinner than said second layer.

4,955,172

VENEER ANCHOR

Neil W. Pierson, 221 N. 7th St., Apt. 7, Mora, Minn. 55051

Filed Sep. 14, 1989, Ser. No. 407,209
Int. Cl.[5] E04B 1/38
U.S. Cl. 52—710 2 Claims



1. A veneer anchor for securing masonry veneer to the exterior surface of a wall and a stud behind the wall, the veneer anchor comprising:

a rectangular integral plate with a solid backing, upper and lower portions, and side portions, each of the upper and lower portions including a pin receiving aperture formed therein, the solid backing including a front face, the solid backing bearable against the exterior surface of the wall,

a pair of pin connectors, each of the pin connectors cooperating with one of the pin receiving apertures for securing the plate to the exterior surface of the wall and the stud behind the wall.

a pair of longitudinally extending angle irons integrally connected to the side portions of the plate and extending inwardly therefrom, the angle irons disposed between the upper and lower portions of the plate so as to be spaced from the pin receiving apertures, each of the angle irons including a longitudinal inner edge, the inner edges forming a longitudinally extending slot, the slot being aligned with the pin receiving apertures, each of the angle irons further including a transverse inner face, and a lateral inner face which form a channel with the front face of the solid backing, and

an integral rigid tie including a triangular rod portion for being set in the masonry veneer, a pair of noncompressible transverse rod portions bearing against each other for their entire lengths, and a pair of lateral rod portions extending away from each other, each of the lateral rod portions having an end, the combined width of the transverse rod portions being substantially equal to the width of the slot so that lateral movement between the transverse rod portion and slot is minimized, the distance between the ends of the lateral rod portions being substan-

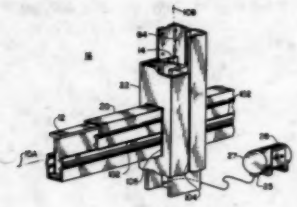
tially equal to the distance between the transverse inner faces so that lateral movement between the lateral rod portions and transverse inner faces is minimized, the diameter of the lateral rod portions being substantially equal to the distance between the lateral inner faces of the angle irons and the front face of the solid backing so that transverse movement of the lateral rod portions relative to the angle irons is minimized whereby lateral and transverse movement of the tie relative the plate is minimized.

4,955,173

STRUCTURAL STEEL CORROSION PROTECTION BY INERT GAS

John K. Czechowski, 18111 Jolly St., Apt. 106, Huntington Beach, Calif. 92648

Filed Sep. 21, 1989, Ser. No. 410,304
Int. Cl.[5] E04C *1/40, 2/34*
U.S. Cl. 52—727 **8 Claims**



1. Apparatus, for use in an protecting an elongated structural steel member from corrosion, comprising:

an elongated rigid envelope extending along a length direction of said structural member and surrounding said structural member, said envelope being gas tight; and

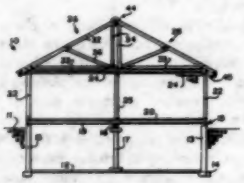
a quantity of inert gas inside said envelope, said inert gas being at a pressure greater than that of the environment around said envelope.

4,955,174

EXPANDABLE BUILDING WITH MODULAR ROOF SYSTEM

Daniel J. Valente, and Elizabeth M. Valente, both of 60 Sweet Rd., Glens Falls, N.Y. 12801

Filed Jan. 17, 1990, Ser. No. 464,856
Int. Cl.[5] E04G *21/00*
U.S. Cl. 52—745 **13 Claims**



1. A method of constructing a one-story building that is expandable to include a second story, comprising the steps of:

(a) constructing a one-story building frame including a plurality of side walls, and a plurality of upper joists extending at the tops of the side walls;

(b) constructing a roof, including pitched roofing sections, and ceiling joists connected at the bottom of the pitched roofing sections;

(c) lifting the constructed roof onto the top of the one-story building frame after construction thereof; and

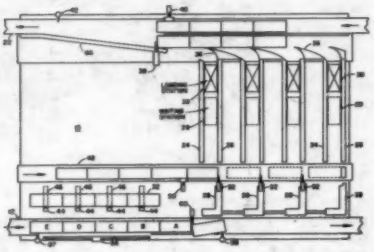
(d) connecting the roof to the one-story building frame, so that the ceiling joists and upper joists are adjacent each other, with readily releasable fasteners.

4,955,175

TWO-STAGE BOX PUSHER FOR CARTON INDEXER

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 6, 1989, Ser. No. 306,015
Int. Cl.[5] B65B *43/42*
U.S. Cl. 53—67 **14 Claims**



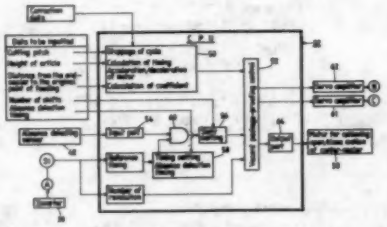
1. In an apparatus for the loading of a plurality of box-like cartons with articles including at least one indexing table for delivering cartons to and from a loading machine, the improvement comprising: a first conveyor for transporting empty boxes across said indexing table; a separating conveyor for transporting empty containers to a loading machine for said table; an intermediate station for said cartons between said first conveyor and said separating conveyor; first pusher means for pushing said cartons from said first conveyor to said intermediate station; second pusher means for pushing said cartons from said intermediate station onto said separating conveyor; an indexer for aligning said boxes at said loading machine; a second conveyor for transporting loaded boxes from said loading machine across said table; and means for merging loaded boxes from the machine on said table with a line of loaded boxes on said second conveyor.

4,955,176

VACANT PACKAGE-PROOFING CONTROL DEVICE FOR PACKAGING MACHINE

Kiyoshi Seko; Masato Hatano, and Shigeki Suzuki, all of Nagoya, Japan, assignors to Fuji Machinery Company Ltd., Aichi, Japan

Filed Nov. 7, 1988, Ser. No. 267,944
Claims priority, application Japan, Apr. 7, 1988, 63-86583
Int. Cl.[5] B65B *57/10, 11/10*
U.S. Cl. 53—73 **8 Claims**



1. A vacant package-proofing control system for a packaging machine, comprising:

a first motor for driving a conveyor for feeding articles to be packaged with a predetermined space defined therebetween into a packaging material which is to be formed into a tube;

a second motor for driving a plurality of rolls which deliver said packaging material formed into said tube at a position disposed downstream of said conveyor;

a third motor for driving a pair of sealers for achieving end-sealing of said packaging material formed into said tube in a crosswise direction relative to the line of feed of said articles to be packaged;

an absence detecting sensor disposed at a predetermined position upstream of a location at which said articles to be packaged are transferred from said conveyor to said tubular packaging material for detecting any absence of a packaging article being transported upon said conveyor with a predetermined amount of space defined between said articles, and for generating a signal in response to detection of said absence of said packaging article;

reference timing pulse generating means for generating predetermined reference timing pulse signals with respect to said feeding of said packaging articles by said conveyor;

means for determining the coincidence of said absence detection signal from said absence detecting sensor and a reference timing pulse signal from said reference timing pulse generating means; and

means for stopping said second motor for feeding said packaging material and said third motor for achieving said end-sealing of said packaging material under gradual deceleration conditions in response to a determination of said coincidence of said absence detection signal from said absence detecting sensor and a reference timing pulse signal from said reference timing pulse generating means by said coincidence determining means, and after a predetermined duration of time during which said second and third motors are stopped for a predetermined number of cycles corresponding to the number of absent packaging articles, for starting said second and third motors under gradual acceleration conditions until the speeds and phases of said second and third motors are synchronized with those of said first motor for driving said conveyor.

4,955,177

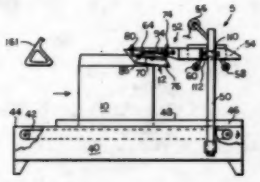
CARTON FLAP FOLDING APPARATUS

Joseph S. Lerner, and David Krukas, both of Kings Park, N.Y., assignors to The Loveshaw Corporation, Ronkonkoma, N.Y.

Filed Oct. 27, 1989, Ser. No. 428,346

Int. Cl.[5] B65B *7/20, 51/06*

U.S. Cl. 53—137 **8 Claims**



1. In a carton taping machine including a conveyor which defines a path of carton forward travel along which a rectangular shipping carton can be transported from a conveyor entrance end to a conveyor discharge end, said carton having opposed carton side walls joined at opposite ends of each with respective carton front and rear walls, juncture of said carton side and front and rear walls presenting carton top and bottom corner structure at each side of the carton, said carton further having side flaps extending upwardly from the carton side walls, said machine including carton tape sealing mechanism downstream from the conveyor entrance end, apparatus for folding down and inward the upwardly extending side flaps to closed lateral positions, said apparatus being upstream the tape sealing mechanism and comprising

head beam structure including support means supporting the head beam structure above the conveyor,

a pair of flap folding plates rotatably mounted on the head beam structure for pivoting of each about a respective one of an associated pair of axes which axes extend obliquely down in the carton forward travel direction and converge toward each other, and

bias means connected to said plates and operable to normally maintain said plates disposed in upright orientation, the mounting of the plates being such that when in upright orientation a first part of each plate extends above its associated pivot axis and a second part below said associated axis, the plates in upright orientation disposing such that front edges of the upwardly extending carton side flaps of a forwardly travelling carton can engage with said plates, the second parts of said plates when said plates are in upright orientation extending below their associated pivot axes to an extent that the top corner structures at the sides of the front of said forwardly travelling carton engage said second plate parts thereby initiating a counter bias pivoting movement of said plates moving the plate first parts in a rearward direction against the carton side flaps for folding said flaps to a closed lateral disposition relative to the carton side walls.

4,955,178

ALIGNMENT APPARATUS WITH GATED OUTPUT FOR IMPACT ALIGNMENT OF WEIGHED BATCHES OF ELONGATED OBJECTS

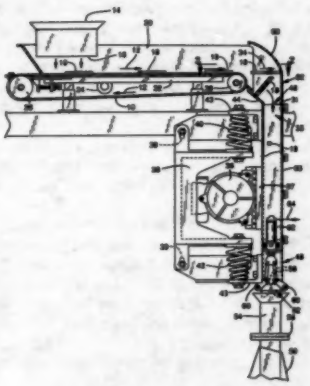
David Shroyer, Richland, Wash., assignor to Lamb-Weston, Inc., Richland, Wash.

Filed Aug. 22, 1989, Ser. No. 397,008

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] B65B *1/22, 35/32, 65/08;* **B65G** *47/14*

U.S. Cl. 53—148 **19 Claims**



10. Alignment apparatus for impact alignment of elongated objects, comprising:

alignment means for aligning said elongated objects, including an alignment container means with a first container means having an inlet opening, an outlet opening, and a vertically-curved deflector wall, a second container means having a supply inlet aligned with the outlet opening of said first container means and having a discharge outlet;

gate means for closing said discharge outlet when said second container means is being filled with said elongated

objects and for opening said discharge outlet to empty said second container means; and

conveyor means for conveying elongated objects and for projecting said objects from said conveyor through the inlet opening of the alignment container in a direction which is substantially perpendicular to the curved deflector wall to cause said objects to strike said curved wall and to be deflected by the impact and discharged from said outlet opening.

4,955,179

COIN WRAPPING PAPER FEEDING APPARATUS FOR COIN WRAPPING MACHINE

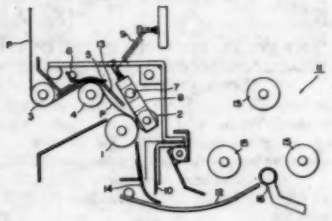
Hideki Kimura, Matsudo, and Shoichi Uda, Tokyo, both of Japan, assignors to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,646

Claims priority, application Japan, Aug. 24, 1988, 63-111025[U]; Aug. 9, 1989, 1-206015

Int. Cl.[5] B65B *11/04*

U.S. Cl. 53—212 **4 Claims**



1. A coin wrapping paper feeding apparatus for a coin wrapping machine in which coin wrapping paper fed out from a coin wrapping paper storing section is cut by cutter means to a predetermined length and the coin wrapping paper is wound around stacked coins by wrapping roller means, thereby to wrap the stacked coins, said coin wrapping paper feeding apparatus comprising

feed roller means disposed between said coin wrapping paper storing section and said cutter means for feeding the coin wrapping paper to said cutter means along a path of travel,

motor means for rotating said feed roller means,

wrapping paper holding means disposed between said coin wrapping paper storing section and said feed roller means along the path of travel with said wrapping paper holding means being located upstream from said feed roller means and said wrapping paper holding means being adapted to hold the coin wrapping paper,

rotation number detecting means for detecting the number of rotations of said feed roller means,

preparatory operation start detecting means for detecting start of a preparatory operation for a coin wrapping operation and outputting a start signal, and

control means for enabling said motor means to start the rotation of said feed roller means and enabling said rotation number detecting means to start the detection of the number of rotations of said feed roller means when receiving the start signal, and enabling the motor means to stop the rotation of said feed roller means when said control means judges that the number of rotations of the feed roller means input from said rotation number detecting means has reached a predetermined value.

4,955,180

METHOD AND APPARATUS FOR FEEDING AND TIGHTENING A BAND IN STRAPPING MACHINE

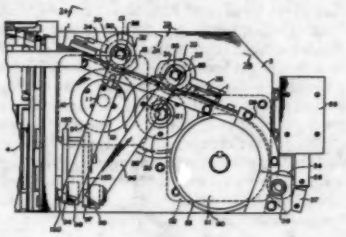
Yasunori Sakaki, Tokyo, and Tsutomu Tagomori, Yokohama, both of Japan, assignors to Strapack Corporation, Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,584

Claims priority, application Japan, Jun. 18, 1987, 62-150206; Jun. 18, 1987, 62-150207

Int. Cl.[5] B65B *13/08, 13/22, 13/32*

U.S. Cl. 53—399 **17 Claims**



1. A method for feeding and tightening a band in a strapping machine, comprising the steps of:

feeding said band in a forward direction, so as to encircle an article to be strapped, by means of a forward rotating driving roller and a forward rotation touch roller,

detecting a decrease in rotational speed of said forward rotation touch roller as may result from said band encountering an obstacle along its feeding path during said feeding of said band in said forward direction while encircling said article to be strapped;

generating a control signal in response to said detection of said decrease in rotational speed of said forward rotation touch roller;

actuating a reverse rotation driving roller and a reverse rotation touch roller in response to said control signal so as to retract said fed band away from said obstacle in a reverse direction along said feeding path; and

deactuating said reverse rotation driving roller and said reverse rotation touch roller after a predetermined period of time so as to permit said forward rotation driving roller and said forward rotation touch roller to again feed said band in said forward direction.

4,955,181

WIPE DOWN APPARATUS FOR STRETCH WRAPPING DEVICES

Larry Casteel, Homerville, Ohio, assignor to Liberty Industries, Girard, Ohio

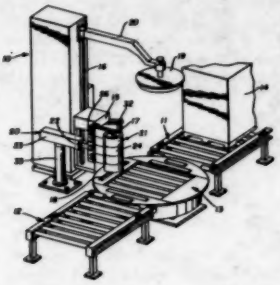
Filed Oct. 27, 1989, Ser. No. 427,502

Int. Cl.[5] B65B *11/04*

U.S. Cl. 53—556 **7 Claims**

1. A wipe down apparatus for use with stretch wrapping device for wrapping a load with a film web, the wipe down apparatus comprises a wiper support, an engagement arm telescopically extensible from said support, a wiper element secured to said free end of said engagement arm, said wiper element comprising at least one wiper including a pair of unequal length strips, one of said strips double back on a portion of itself forming a loop in spaced relation to the engagement arm, means for securing the unequal free ends of said strip to each other and to one of said strips inwardly from its secured

free end, means for securing the abutting ends of said strips to said engagement arm, means for moving said engagement arm



and said wiper support in relation to said load and means for cutting said film web within a film plane path.

4,955,182

ANTI-RUB DEVICE AND METHOD FOR PROTECTING A HORSE'S COAT FROM DAMAGE FROM A HORSE BLANKET

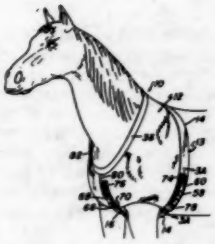
Marlene Newman, 1072 St. Mathews Rd., Chester Springs, Pa. 19425

PCT No. PCT/US89/01713, § 371 Date Mar. 8, 1990, § 102(e) Date Mar. 8, 1990, PCT Pub. No. WO89/10325, PCT Pub. Date Nov. 2, 1989

PCT Filed Apr. 21, 1989, Ser. No. 487,990

Int. Cl.[5] B68C *5/00*

U.S. Cl. 54—79 **27 Claims**



1. An anti-rub device for protecting the coat of a horse at the points of the shoulders of the horse's front legs, said device being securable about a horse for use under a horse blanket and including:

a. a main body portion including a stretchable fabric which is stretchable in both the warp and weft directions, said stretchable fabric having a low friction surface adapted to support a portion of a horse blanket thereon and a low friction surface for engaging the coat of the horse, said main body portion having a passage for surrounding the neck of the horse, and, being attached to said horse in a stretched condition so that said main body portion is in tight conformity with the horse in regions overlying the withers, overlying the chest of the horse in the region forward of the front legs and overlying the points of the shoulders of the horse's front legs; and

b. securement means for securing the main body portion in a stretched condition into tight conformity with the torso of the horse in regions overlying the withers, overlying the chest of the horse in a region forward of the front legs, and overlying the points of the shoulders of the horse's front legs, whereby said low friction surfaces of said stretchable fabric and the tight conformity of the main body portion with the horse protect the coat of the horse at the points of the shoulders of the horse's front legs against chafing when a horse blanket is disposed over said anti-rub device.

4,955,183

BURNER FOR DIFFICULT TO COMBUST GAS MIXTURES

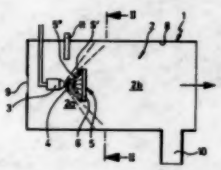
Rainer Kolodzie, Munich; Dieter Goerlich, Emmering, and Roland Flois, Graefelfing, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany

Filed Feb. 15, 1989, Ser. No. 310,588

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807632.2; Aug. 19, 1988, 3828256

Int. Cl.[5] F01N *3/26*

U.S. Cl. 60—303 **11 Claims**



1. Burner for difficult to combust gas mixtures, such as exhaust gases of an internal combustion engine, comprising a combustion chamber, a baffle barrier dividing said combustion chamber into a first, pilot flame zone and a second, main fuel combustion zone at opposite sides thereof, means for supplying fuel and combustion air to said pilot flame zone, means for supplying exhaust gases to said fuel combustion zone, and ignition means in said pilot flame zone for creating a pilot flame thereat; wherein said fuel supply is provided by a fuel injection nozzle in the form of a fuel jet; wherein said baffle barrier is disposed in a position causing a first portion of the fuel jet supplied to the pilot flame zone to impinge thereon, and a second portion of said fuel jet to pass through the baffle barrier into the main fuel combustion zone; and wherein the pilot flame created by said ignition means forms a means for igniting said second portion of the fuel jet in said main combustion zone utilizing the exhaust gases supplied thereto as an oxygen supply for combustion thereof.

4,955,184

METHOD AND EQUIPMENT FOR FORMING MULTIPLE PACKS OF PRODUCTS, PARTICULARLY FOOD PRODUCTS

Renzo Francioni, Prato Sesia, Italy, assignor to Cavanna S.p.A., Italy

Filed Jun. 19, 1989, Ser. No. 367,877

Claims priority, application Italy, Feb. 13, 1989, 67083 A/89

Int. Cl.[5] B65B *9/06, 35/40*; B65G *47/24*

U.S. Cl. 53—448 **15 Claims**

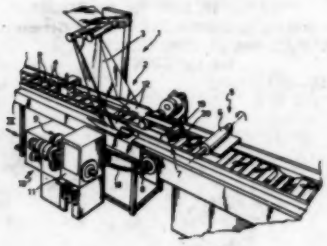
1. A method of forming, from a flow of products, multiple packs each including a group constituted by a given number of said products collected in a tubular wrapper which is closed at its ends by welding, in which it includes the steps of forming the wrapper in a predetermined zone and closing the wrapper by the welding of its ends in a closure zone situated downstream of the predetermined zone in the direction of flow of the products, said closure zone having a given length in that direction, wherein the method further includes the steps of:

continuously advancing the flow of products towards the predetermined zone while maintaining a uniform distance between successive products in the flow in a first zone, the

distance being determined by the ration between the given length and the given number of products;

continuously advancing the flow of products toward the predetermined zone along a second zone;

substantially stopping the movement of one of the given number of products while the one product is in the second zone, so as to cause the formation of a group of products by the products being advanced in the second zone in a spaced relationship until their advancement is stopped by abutment up against the one stopped products or a product stopped by abutment with stopped products abutting



the one stopped product, until the number of stopped products equals the number of products for the group;

then releasing the one stopped products so that the group of stopped products are again continuously moved, in unison packed together, toward the closure zone as a group of products;

wherein the releasing of the one stopped product to allow the continuous advancing to be resumed, provides successive groups of products each including the given number of products and separated by a gap substantially equal in length to the given length of the closure zone.

4,955,185

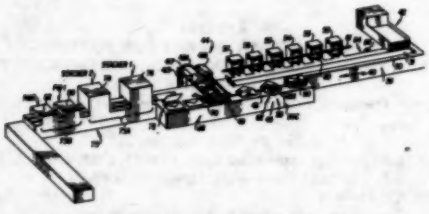
INSERTION MACHINE

Dave Haas, Schaumburg; Gary VanderSyde, Naperville; Paul Beatty, and Ren Roxas, both of Chicago, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Division of Ser. No. 30,015, Mar. 25, 1987, Pat. No. 4,798,040. This application Nov. 15, 1988, Ser. No. 271,258

Int. Cl.[5] B65B *25/14*

U.S. Cl. 53—460 **32 Claims**



1. An insertion machine comprising:

an envelope opening station;

means for positioning an envelope in said envelope opening station;

an insertion station positioned proximate said envelope opening station for inserting at least one item into an at least partially opened envelope, said insertion station including a carriage which reciprocates in a direction toward said envelope opening station and in a direction away from said envelope opening station, said carriage having at least one finger movably mounted with respect to said carriage for movement to a finger first orientation whereat said finger is usable for inserting an item into an envelope and for movement to a finger second orientation;

error detection means for detecting an error condition at said insertion station;

control means responsive to said error detecting means for controlling whether said finger moves to said finger first orientation or to said finger second orientation; and,

means for transporting at least one item to said insertion station.

4,955,186

ENVELOPE TRANSPORT MEANS

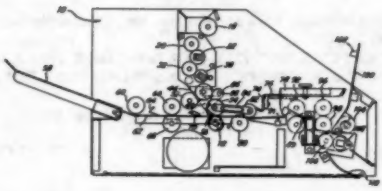
Rex M. K. Gough, Cambridge, United Kingdom, assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Apr. 7, 1989, Ser. No. 335,176

Claims priority, application United Kingdom, Apr. 8, 1988, 8808313; May 6, 1988, 8810698

Int. Cl.[5] B65B *43/52*

U.S. Cl. 53—569 **6 Claims**



1. Envelope transport means for driving an envelope in an inserter apparatus, said transport means including a driven roller, an idler roller mounted for relative movement into and out of engagement with said driven roller, clamp means for clamping the envelope against movement, and actuator means for effecting engagement and disengagement of said rollers and clamping and unclamping of the clamp means, said actuator being movable between a transport position in which said rollers are engaged and said clamp means is unclamped and an insert position in which said rollers are disengaged and said clamp means is clamped.

4,955,187

MOWING MACHINE

Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland

Division of Ser. No. 18,287, Feb. 24, 1987, Pat. No. 4,827,703. This application Apr. 14, 1989, Ser. No. 338,148

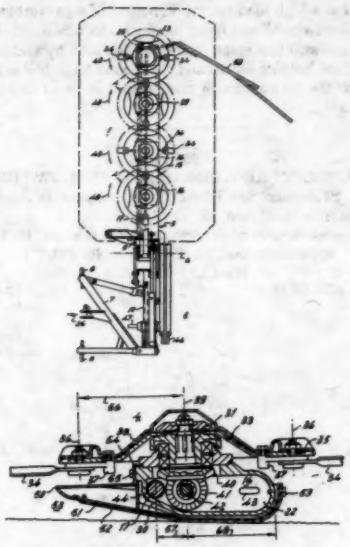
Claims priority, application Netherlands, Feb. 24, 1986, 8600452; May 30, 1986, 8601394

Int. Cl.[5] A01D *34/66*

U.S. Cl. 56—13.6 **63 Claims**

1. A mowing machine comprising a mowing bar, said mowing bar further comprising at least two mowing units, each of said mowing units having a mowing member and a partly hollow supporting housing, at least two partly hollow spacers; one said mowing member being connected to each said supporting housing capable of rotation about an essentially vertical axis of rotation and said supporting housings and said spac-

ers being alternately interconnected by a first and second detachable tensile means, said two tensile means extending



through the cavities provided within said supporting housings and spacers.

4,955,188

ROUND BALER

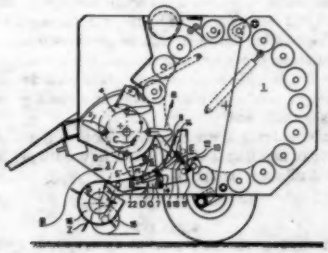
Wilhelm von Allwörden, Gailingen, Fed. Rep. of Germany, assignor to Greenland GmbH & Co. KG, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 349,659

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816204

Int. Cl.[5] A01D *39/00*; B30B *15/08*

U.S. Cl. 56—341 **12 Claims**



1. A round baler for cut stalk crops comprising a hinge-type pressing chamber including an inlet opening for said stalk crops and a tying arrangement for the completed bale, a pick-up device for said stalk crops, a feed drum which is disposed between said pick-up device and said inlet opening and whose length corresponds to the length of the bale to be formed, a cutting device provided in a feed channel, wherein said cutting device includes a plurality of pivotally-supported knives which in their cutting position project into said feed channel and are arranged in at least one row, and which are held in their cutting position by means of spring-loaded knife levers and adapted to be pivoted against the spring load up to a position in which they have no cutting effect on said stalk crops, and wherein a sensor for sensing the internal pressure of said round bale is provided, said sensor controlling a pivoting device for said cutting device for pivoting said knives out of said feed channel when a predetermined value of said pressure is sensed.

4,955,189

WORSTED YARN-LIKE FALSE-TWISTED YARN

Masaaki Yanagihara, Ehime; Katsutoshi Taniguchi, and Muneaki Awata, both of Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan

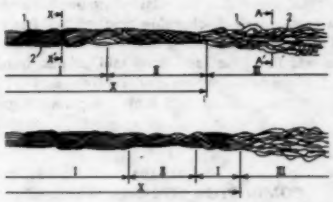
PCT No. PCT/JP88/01142, § 371 Date Jul. 5, 1989, § 102(e) Date Jul. 5, 1989, PCT Pub. No. WO89/04389, PCT Pub. Date May 18, 1989

PCT Filed Nov. 11, 1988, Ser. No. 381,731

Claims priority, application Japan, Nov. 12, 1987, 62-284362

Int. Cl.[5] D02G *3/24, 1/02, 3/26, 3/34*

U.S. Cl. 57—207 **10 Claims**



1. A worsted yarn-like false-twisted yarn composed of at least two kinds of multi-filaments differing in denier, which filaments simultaneously satisfy (i) the requirement that the thickness of the large-denier filaments should be a least 4 de and (ii) the requirement that the thickness of the small-denier filaments should be 0.7 to 2 de, in which yarn bundled portions consisting of alternately twisted yarn-like wrapped portions and entangled portions, and open portions are alternately arranged along the longitudinal direction of the yarn, and wherein (A) in the alternately twisted yarn-like wrapped portions, a covering composed mainly of the small-denier filaments is wrapped substantially in a bundle form on a core portion composed mainly of the large-denier filaments, (B) in the open portions, a covering composed mainly of the small-denier filaments which are opened to one another covers a core composed mainly of the large-denier filaments substantially in parallel to the yarn axis in the successively reversed form, (C) the length (L1) of the open portions is at least ½ of the length (L2) of the bundled portions, and (D) in the unit length of the false-twisted yarn, the small-denier filaments are longer than the large-denier filaments and the difference in the length between the small-denier filaments and the large-denier filaments is 13 to 25% based on the length of the large-denier filaments.

4,955,190

METHOD FOR DRIVING A GAS TURBINE UTILIZING A HEXAGONAL PRESSURIZED FLUIDIZED BED REACTOR

Archibald S. Robertson, Jr., Whitehouse Station, N.J., assignor to Foster Wheeler Development Corporation, Livingston, N.J.

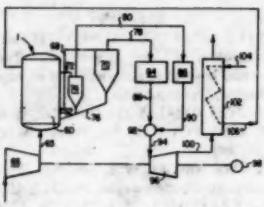
Division of Ser. No. 166,573, Mar. 10, 1988, abandoned. This application Nov. 14, 1989, Ser. No. 437,056

Int. Cl.[5] F02C *3/28*

U.S. Cl. 60—39.02 **5 Claims**

1. A method of operating a gas turbine comprising the steps of forming three separate combustion cells in a single vessel, forming a bed of particulate material including fuel in each of said cells, passing air through each of said beds, the quantity of air passed through two of said cells being sufficient to fluidize

said particulate material in their respective beds and promote the combustion of said fuel, and the quantity of said air passed to the other of said cells being insufficient for complete combustion of said fuel but sufficient to generate a combustible off-gas, the flue gases from the combustion in said two cells passing through the length of said two cells and entraining a



portion of said particulate material before discharging from an outlet in said vessel; discharging said off-gas from another outlet of said vessel, separating the entrained particulate material from said flue gases and from said off-gas, burning said separated off-gas in the presence of said flue gases to raise their temperature, and passing said high temperature gases to a turbine.

4,955,191

COMBUSTOR FOR GAS TURBINE

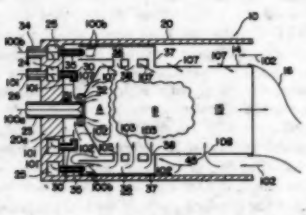
Hiroaki Okamoto; Takeshi Takahara, both of Yokohama, and Fukuo Maeda, Machida, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 26, 1988, Ser. No. 262,982

Claims priority, application Japan, Oct. 27, 1987, 62-270576

Int. Cl.[5] F02C *3/14, 3/30*

U.S. Cl. 60—39.3 **9 Claims**



1. A gas turbine combustor for a gas turbine plant comprising:

an outer casting having an end plate closing one end of said outer casing;

an inner cylinder constituting a combustor liner coaxially located with said outer casing, an interior of said combustor liner being divided into a first stage of combustion area which is disposed on an upstream side near said end plate and in which a first stage fuel and air are mixed and burned and a second stage of combustion area which is disposed on a downstream side of said first stage combustion area and in which a premixture of a second stage fuel diluted by air is supplied, said combustor liner being provided with a port means through which said premixture is supplied thereinto;

a first supply means including nozzle means for supplying water or vapor into said first stage of combustion area;

a second supply means for supplying the second stage fuel into said second stage combustion area; and

means for stabilizing the combustion in said first stage of combustion area and holding a flame in said first stage of combustion area;

wherein the water or water vapor is mixed with first stage fuel at a high load operation period of a gas turbine so as to form a stabilized flame having no locally highly heated area in said first stage of combustion area by said stabilizing and holding means and the second stage fuel is burned with the premixture in said second stage of combustion area.

4,955,192

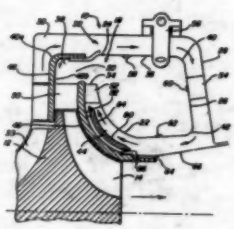
CONTAINMENT RING FOR RADIAL INFLOW TURBINE

Jack R. Shekleton, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Continuation-in-part of Ser. No. 291,041, Dec. 28, 1988. This application Dec. 12, 1988, Ser. No. 283,079

Int. Cl.[5] F23R *3/00*

U.S. Cl. 60—39.36 **12 Claims**



1. A gas turbine, comprising:

a rotor including a radial inflow turbine wheel having blades and a nozzle outwardly of said turbine blades, said nozzle being adapted to direct hot gases at said turbine blades to cause rotation of said rotor;

an annular combustor about said rotor and having an outlet to said nozzle, said annular combustor having spaced inner and outer walls, said inner and outer walls being connected by a generally radially extending wall;

a housing substantially surrounding said annular combustor in spaced relation to said inner, outer and radially extending walls thereof, said housing defining a dilution air flow path including a radially outer compressed air inlet in communication with a compressor supplying dilution air at one end thereof and a radially inner dilution air outlet in communication with said annular combustor adjacent said outlet at the other end thereof, said dilution air flow path extending substantially entirely about said annular combustor to cool said inner, outer and radially extending walls thereof; and

a containment ring at least partially about said turbine wheel and on or abutting said dilution air flow path just upstream of said dilution air outlet.

4,955,193

ADJUSTABLE SHIELD FOR MOTORCYCLE EXHAUST PIPE

Herbert W. Hoeptner, III, Morgan Hill, Calif., assignor to Custom Chrome, Inc., Morgan Hill, Calif.

Filed Jul. 17, 1989, Ser. No. 380,535

Int. Cl.[5] B60K *13/04*

U.S. Cl. 60—320 **8 Claims**

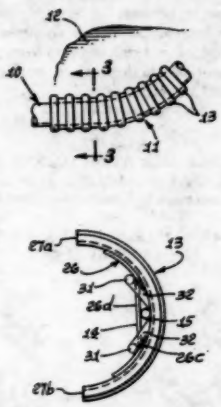
1. Heat shield structure for a motorcycle exhaust pipe having an outer side, comprising:

(a) a series of telescopically interfitting shield members defining a lengthwise axially elongated shield sized to fit over the outer side of the exhaust pipe, the members having a c-shape about said axis,

(b) and a rod extending adjacent the members and connected thereto,

(c) the rod being bendable, accompanied by relative angular adjustment of the members, to conform to a bend in the exhaust pipe, said members having mid-points and the rod located at approximately said mid-points of the members,

(d) and means attached to the shield for attaching the shield



to the exhaust pipe, to extend lengthwise thereof and at the outer side thereof, said means including a strap, and a holder retained by the rod, said member shaving inner sides and said rod is located at said inner sides of said members, the strap entrained by the holder,

(e) the holder having a shallow V-shape relative to said axis, and extending in a loop, with arms entrained by the strap, said arms extending generally parallel to the rod.

4,955,194

DAMPING ARRANGEMENT FOR DAMPING THE OSCILLATIONS OF VALVE CONTROLLED BY PRESSURE FLUID

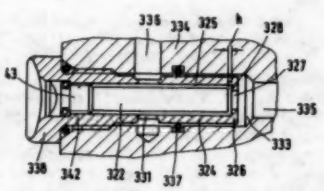
Thorkild Christensen, Sonderborg; Svend E. Thomsen, Nordborg, both of Denmark, and Siegfried Zenker, Kirchseeon, Fed. Rep. of Germany, assignors to Danfoss A/S, Nordborg, Denmark and Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 248,924, , abandoned. This application Oct. 10, 1989, Ser. No. 418,969

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733740

Int. Cl.[5] F16D *31/06*; G05D *23/00*

U.S. Cl. 60—329 **6 Claims**



1. A damping arrangement for damping oscillations in operable mechanism that includes a source of pressurized fluid, a fluid operated motor, a supply line for connecting the source to the fluid operated motor, at least one pressure controlled valve connected in the supply line that has a control pressure input port and a control pressure output port, a main valve connected in the supply line downstream of the pressure controlled valve, a first pressure control line connected between the input port and supply line, and a second pressure control line connected between the output port and supply line, comprising throttle means in at least one of the control lines for at least partially eliminating hydraulic resistance changes resulting from temperature changes damping oscillations of valves, the throttle means including a housing having a first end portion, an axially opposite second end portion defining an interior end face, and an intermediate sleeve portion extending between the housing end portions and having annular wall means defining an axially elongated bore that opens to the housing end face and to the first end portion, the first end portion being joined to the sleeve portion axially opposite the housing end face to form a sleeve portion closure, the housing second end portion having a central holes that provides an inlet port opening through the housing end face to the bore to provide a first fluid connection to the respective control line, the housing end face being planar radially from the wall means to the hole, and an axial elongated rod located in the bore to provide an annular clearance space from the rod to the wall means that is structurally free from the housing first portion to the housing end face, the rod having a first end portion mounted in fixed relationship to the housing first end portion and a second end portion defining an end face axially spaced from the housing end face by a gap height h to provide an annular throttle gap, the housing intermediate portion having an output port to provide a second pressure connection to the respective control pressure line and opening to the clearance space, the housing and rod being made of materials having different coefficients of expansion to vary h oppositely of the variation of the temperature of the pressurized fluid to at least partially compensate for changes in temperature, the length of the faces, the height h and the rod and housing materials are selected so that the rectilinear characteristic graph h_1 of the gap height against temperature in the temperature operating range twice intersects a corresponding curve h_2 for a constant hydraulic resistance.

4,955,195

FLUID CONTROL CIRCUIT AND METHOD OF OPERATING PRESSURE RESPONSIVE EQUIPMENT

Marvin R. Jones, Houston, and Joseph L. LeMoine, Brookshire, both of Tex., assignors to Stewart & Stevenson Services, Inc., Houston, Tex.

Filed Dec. 20, 1988, Ser. No. 287,180

Int. Cl.[5] F16D *31/02*

U.S. Cl. 60—405 **18 Claims**

1. A control circuit for supplying fluids to a pressure responsive valve operator having a double acting piston and cylinder assembly comprising,

a fluid supply,

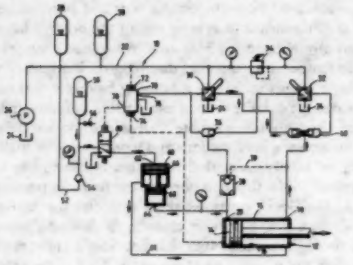
a first control valve connected between the fluid supply and both sides of the piston and cylinder assembly,

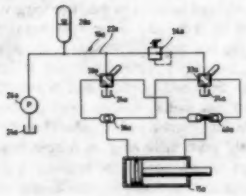
a pressure regulator connected to the fluid supply,

a second control valve connected between the pressure regulator and both sides of the piston and cylinder assembly,

a first selector check valve connected between one side of

the assembly and each of said first and second control valves, and





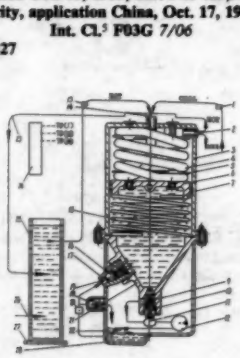
a second selector check valve connected between the second side of the assembly and each of the first and second control valves.

4,955,196

INTERNAL ENERGY ENGINE (IEE)

Zhichun Lin, 7-26, Weixing Road, and Dongsheng Wang, both of Changchun, China, assignors to Zhichun Lin, China

Filed Oct. 11, 1989, Ser. No. 419,900
Claims priority, application China, Oct. 17, 1988, 88107240.0
Int. Cl.[5] F03G *7/06*
U.S. Cl. 60—527 **13 Claims**



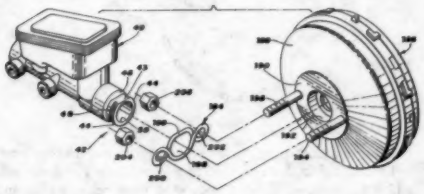
1. In an internal energy engine, the combination comprising cylinder means, said cylinder means comprising an upper end and a lower end, piston means fitted for reciprocating position within said cylinder means, temperature responsive means consisting essentially of SMA means fitted in said cylinder means between said upper end of said cylinder means and the upper end of said piston means, means to supply hot fluid to said cylinder means, means to supply cool fluid to said cylinder means, means to expose said SMA means to said hot and said cool fluids supplied to said cylinder means alternately, means to define a compressed working medium chamber in said cylinder means below said piston means and above said lower end of said cylinder means, means defining a working medium sump in the lower end of said cylinder means below said working medium chamber, check type admission valve means in said chamber defining means, working medium pump means arranged to pump working medium from said sump into said chamber via said admission valve means, said chamber defining means also comprising high pressure working medium outlet valve means, tank means for receiving the high pressure working medium from said outlet valve means; and means to flow said high pressure working medium from said tank means to a point of use of said high pressure working medium and thence back to said sump means.

4,955,197

MASTER CYLINDER ATTACHMENT ADAPTER

John R. Coleman, Dayton, and Malvin L. Schubert, Kettering, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 11, 1989, Ser. No. 405,502
Int. Cl.[5] B60T *13/00*
U.S. Cl. 60—547.1 **7 Claims**



1. Apparatus for connecting a master cylinder to a brake booster of the type having a shell with a planar front surface having a pushrod projecting from a bore therein and a plurality of threaded studs displayed about the bore and projecting from the planar front surface, comprising:

a master cylinder having an end portion facing the booster;

retaining means carried by the end portion of the master cylinder;

adapter means adapted to engage with the retaining means carried by the end portion of the master cylinder and having a plurality of apertures which register with the plurality of threaded studs;

and a plurality of threaded nuts installed on the threaded studs to retain the adapter means in engagement with the planar surface of the booster shell.

4,955,198

CLUTCH BOOSTER

Ichiro Yanagawa, and Hirohisa Hara, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed May 15, 1985, Ser. No. 734,102
Claims priority, application Japan, May 24, 1984, 59-105572
Int. Cl.[5] B60T *13/20*
U.S. Cl. 60—551 **7 Claims**

1. A clutch booster for amplifying the manual force upon a clutch control device to be relayed to a clutch engaging lever comprising, in combination;

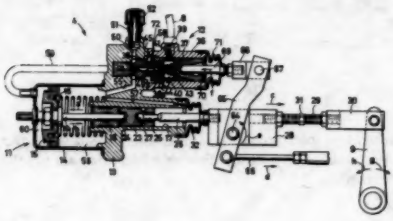
(a) power piston means connected operatively through an output rod to said clutch engaging lever and driven in longitudinal reciprocating motion under the operating fluid pressure supplied from an external source of pressure, said power piston means being aligned with said output rod in a substantially straight line;

(b) control valve means disposed on route of passage means for said operating fluid pressure to be supplied to said power piston means;

(c) pivot lever means mounted pivotally at the middle portion thereof on said output rod;

(d) linkage or cable means connected operatively at one end thereof of said clutch control device and at the opposite end to one end of said pivot lever means, and extending along in the directions of reciprocating motion of said output rod;

(e) relay piston means operatively connected to said power piston means and to said output rod, said relay piston



means includes a movable connector joint operatively connected to one end of said output rod for permitting a swinging motion of said output rod as motion is imparted thereto through said pivot lever means; and

(f) connector means connecting operatively said control valve means to the opposite end of said pivot lever means, and adapted to operate said control valve means when said linkage or cable means are pushed or pulled in the direction of forward stroke motion of said output rod means.

4,955,199

DRIVE SYSTEM FOR TURBOCHARGERS WITH ROTARY ELECTRIC MACHINES

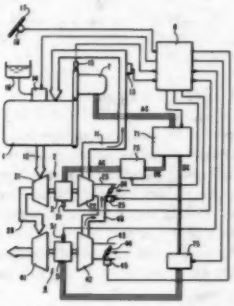
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Fujisawa, Japan

Filed Jul. 18, 1989, Ser. No. 381,320

Claims priority, application Japan, Jul. 18, 1988, 63-178723

Int. Cl.[5] F02B *37/04*

U.S. Cl. 60—608 **11 Claims**



1. A turbocharger drive system combined with an internal combustion engine, comprising:

a turbocharger assembly having a rotatable shaft;

a first rotary electric machine mounted on said rotatable shaft;

means for detecting a load on the internal combustion engine;

means for detecting a rotational speed of the internal combustion engine;

means for supplying fuel to the internal combustion engine;

a second rotary electric machine operatively coupled to an output shaft of the internal combustion engine;

means for driving said first rotary electric machine as an electric motor when it is determined from signals from said means for detecting the load and said means for detecting the rotational speed that the internal combustion engine rotates at a low speed and under a high load;

means for operating said second rotary electric machine as an electric generator;

means for supplying electric power generated by said electric generator to said electric motor; and

means for delaying a timing to supply fuel from said fuel supplying means to the internal combustion engine when at least one of an increase in the load and a reduction in the rotational speed is detected by said means for detecting the load and said means for detecting the rotational speed.

4,955,200

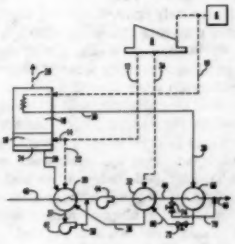
REHEATER PIPING AND DRAIN COOLER SYSTEM

Paul W. Viscovich, Longwood, and George J. Silvestri, Jr., Winter Park, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 17, 1989, Ser. No. 353,364

Int. Cl.[5] F01K *7/40*

U.S. Cl. 60—667 **13 Claims**



1. A method for heat rate improvement in a steam turbine thermal cycle employing a steam-to-steam reheating system having a high pressure moisture-separator-reheater (MSR) with a reheater drain for fluid, a plurality of feedwater heaters connected in series to heat feedwater at increasing pressure, each of the feedwater heaters having an inlet, an outlet for feedwater, and a heat exchanger connecting in heat exchange relationship with feedwater exiting the highest pressure feedwater heater, the system utilizing scavenging steam to prevent moisture buildup, a method of improving heat rate comprising the following steps:

connecting the MSR reheater drain directly to the heat exchanger for passing the drain fluid in heat exchange relationship with outlet feedwater from the feedwater heater having the highest pressure;

drawing the drain fluid from the heat exchanger and directing it into the feedwater heater having the highest pressure; and

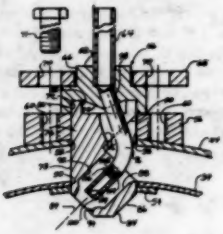
adjusting the mass of outlet feedwater from the highest pressure feedwater heater passing through the heat exchanger to control the heat exchange capability of the heat exchanger in a manner to set the amount of scavenging steam within the system to optimally adjusted values for varying load conditions.

4,955,201

FUEL INJECTORS FOR TURBINE ENGINES

Jack R. Shekleton, San Diego, and John P. Archibald, La Jolla, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 14, 1987, Ser. No. 133,491
Int. Cl.[5] F23R *3/16*
U.S. Cl. 60—738 **5 Claims**



1. A turbine engine comprising:
a rotatable turbine wheel;
a rotary compressor coupled to said turbine wheel;
an annular combustor for receiving compressed air from said compressor and fuel from a fuel source and burning the same to provide gasses of combustion to drive said turbine wheel, said combustor including a radially inner annular combustion zone surrounded by a radially outer annular compressed air manifold defined by spaced inner and outer walls with said inner wall defining the outer extremity of said combustion zone;
a plurality of angularly spaced injector assemblies mounted on said outer wall and extending through said inner wall into said combustion zone, each said injector assembly including an elongated body located generally on a radius of said combustion zone having a hollow interior with a port at one end opening into said combustor zone generally tangentially thereto, said body further having at least one inlet to said hollow interior located in a side of said body between said inner and outer walls, and a fuel injecting somewhat J-shaped, tube within said hollow interior and terminating within said hollow interior adjacent said port in an open end in alignment therewith and generally tangential to said combustion zone; and
a venturi surface just inwardly of said port, said open end of said tube being located as close to said venturi surface as is possible without said tube increasing the resistance to the flow of air from said hollow interior through said port.

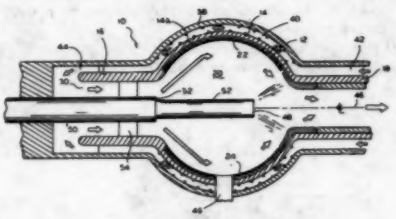
4,955,202

HOT GAS GENERATOR

Jack R. Shekleton, San Diego, and Robert W. Smith, Lakeside, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 12, 1989, Ser. No. 324,806
Int. Cl.[5] F23R *3/42*
U.S. Cl. 60—753 **12 Claims**

1. A hot gas generator, comprising:
a vessel having a wall defining narrow, spaced apart inlet and outlet ends interconnected by a relatively wide, generally spherical combustion chamber;
a pair of smooth hemispherical liners loosely positioned within said wall so as to be disposed about said combustion chamber, said hemispherical liners normally having a groove at an interface therebetween and being formed of a material adapted to thermally expand radially and circumferentially under heat, said hemispherical liners expanding to close said groove at said interface in a manner producing relatively little stress thereon;
the portion of said wall defining said combustion chamber including a generally spherical recess sized to loosely receive said hemispherical liners so as to accommodate radial and circumferential thermal expansion relative thereto;



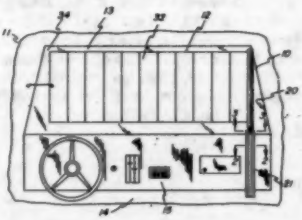
an oxidant inlet port at said inlet end of said wall; and
a fuel discharge port for directing fuel into said combustion chamber.

4,955,203

AIR CONDITIONER FOR PARKED AUTOMOTIVE VEHICLE

Shaam P. Sundhar, 87 Juniper Ave., Westerville, Ohio 43081

Filed Aug. 16, 1989, Ser. No. 394,447
Int. Cl.[5] F25B *21/02*
U.S. Cl. 62—361 **17 Claims**



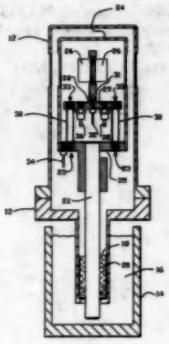
1. An air conditioner for an automotive vehicle comprising
a cooling unit, said cooling unit located in the trunk of said automotive vehicle, said cooling unit comprising a cooling chamber having at least one insulated wall, said cooling chamber including a cooling fan, said insulated wall having on opposing sides thereof a heat sink and a cooling block, said cooling block being located in said cooling chamber, said heat sink and cooling block having therebetween a thermoelectric chip, said cooling unit also comprising a hot air chamber, said hot air chamber including an exhaust fan,
an air intake conduit connected to said cooling unit,
a cool air conduit connected to said cooling chamber,
an exhaust conduit connected to said hot air chamber, and
means for supplying power to said cooling unit, said means for supplying power to said cooling unit is by at least one solar panel positioned interiorly near the front window of said automotive vehicle, said means for supplying power movably mounted in said automotive vehicle, said means for supplying power secured to mounting means, said mounting means mounted in a retention means which includes a C-shaped channel.

4,955,204

CRYOSTAT INCLUDING HEATER TO HEAT A TARGET

Richard H. Pohl, Berkeley; Norman W. Madden, Livermore, and Donald F. Malone, Oakland, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Nov. 9, 1989, Ser. No. 434,249
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.1 28 Claims



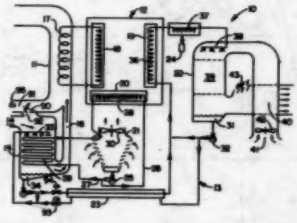
1. A cryostat comprising:
a vacuum vessel;
a target disposed within said vacuum vessel;
heat sink means disposed within said vacuum vessel for absorbing heat from said target;
cooling means for cooling said heat sink means;
cryoabsorption means for cryoabsorbing residual gas within said vacuum vessel; and
heater means for maintaining said target above a temperature at which the residual gas is cryoabsorbed in the course of cryoabsorption of the residual gas by said cryoabsorption means.

4,955,205

METHOD OF CONDITIONING BUILDING AIR

William H. Wilkinson, Columbus, Ohio, assignor to Gas Research Institute, Chicago, Ill.

Division of Ser. No. 302,428, Jan. 27, 1989, Pat. No. 4,905,479.
This application Dec. 4, 1989, Ser. No. 445,987
Int. Cl.[5] F25D *17/08*
U.S. Cl. 62—94 4 Claims



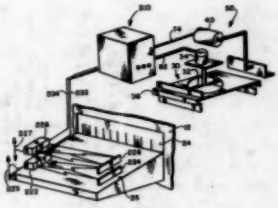
2. In a method of operating a hybrid air conditioning system comprised of a refrigeration subsystem and a liquid desiccant dehumidification subsystem having dehumidifier, cooling tower, desiccant regenerator, and air-to-air recuperative heat exchanger components, the steps comprising:
a. flowing a controlled mixture of relatively dilute desiccant solution and relatively concentrated desiccant solution to said dehumidifier component, and
b. controlling the mixing of said desiccant mixed solution in response to a relative humidity condition detected in a building enclosed space receiving air conditioned by the hybrid air conditioning system.

4,955,206

LIQUID CRYOGEN FREEZER WITH IMPROVED VAPOR BALANCE CONTROL

Gary D. Lang, Naperville, and Benjamin Zyer, Orland Park, both of Ill., assignors to Liquid Carbonic Corporation, Chicago, Ill.

Filed Nov. 30, 1989, Ser. No. 443,903
Int. Cl.[5] F17D *17/00*
U.S. Cl. 62—186 21 Claims



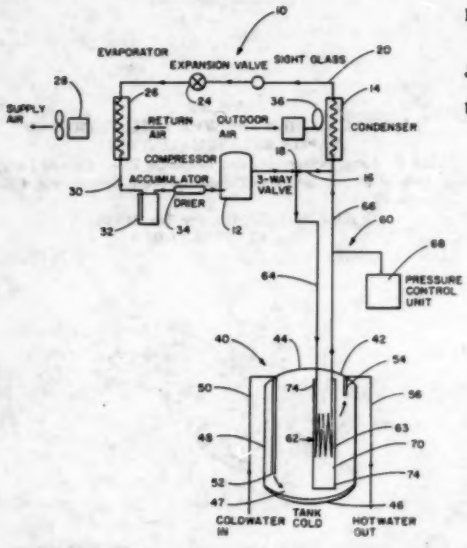
1. A cryogenic freezer apparatus for food products, comprising:
a thermally insulated enclosure having at least an entrance opening and an exit opening;
conveyor means for conveying products through said enclosure, from said entrance opening to said exit opening;
cryogen means in said enclosure for producing cryogen vapor near one of said enclosure openings;
blower means associated with said enclosure and selectively operable in response to a blower control signal to selectively apply different levels of suction adjacent said one enclosure opening to direct differing amounts of cryogen vapor away therefrom;
photocell means outside said enclosure, generally adjacent said one enclosure opening for detecting cryogen vapor exiting said one enclosure opening and for generating at least one sensor output signal in response thereto, said at least one sensor output signal being indicative of the amount of cryogen vapor flowing out of said one opening; and
blower control means coupled to said photocell means and to said blower means for generating a blower control signal in response to said at least one sensor output signal, so that, with increasing vapor detected outside said one opening of said enclosure, the blower means increases suction of cryogen vapor away from said enclosure opening, so as to limit the outflow of cryogen vapor passing through said one enclosure opening to about a preselected amount needed to prevent intrusion of the ambient environment through said one enclosure opening, despite increasing volume of cryogen vapor generated in said enclosure, and so that output of the blower means is decreased with decreasing cryogen injection to ensure that at least about the preselected cryogen outflow is maintained at said one opening to prevent intrusion of the ambient environment therethrough.

4,955,207

COMBINATION HOT WATER HEATER-REFRIGERATION ASSEMBLY

Clark B. Mink, 648 Almeda Ct. No., St. Petersburg, Fla. 33702

Filed Sep. 26, 1989, Ser. No. 412,347
Int. Cl.[5] F28D *15/02*; F24D *17/02*
U.S. Cl. 62—238.6 **1 Claim**



1. A combination hot water heater-refrigeration assembly comprising:

(A) a hot water heater unit which includes

(1) a tank for containing water to be heated, said tank having a bottom and a top with a cold water inlet located adjacent to said bottom and a hot water outlet located adjacent to said top, and

(2) heater means for heating the water contained in the tank;

(B) a refrigeration system which includes

(1) a compressor for compressing fluid, such as Freon.

(2) a condenser fluidically connected to said compressor and receiving compressed fluid therefrom,

(3) a three-way valve fluidically connecting said compressor to said condenser; and

(C) a water heating heat transfer system which includes

(1) a heat exchange element in said hot water heater unit tank,

(2) an inlet fluid line fluidically connecting said three-way valve to said heat exchange element and conducting fluid from said compressor to said heat exchange element,

(3) an outlet fluid line fluidically connecting said heat exchange element to said condenser and conducting fluid from said heat exchange element to said condenser,

(4) a heat pipe in said tank and having a heat absorber at one end in heat transferring association with said heat exchange element, said heat pipe having a heat releaser at another end in heat transferring association with water located adjacent to the bottom of the tank,

(5) said heat exchange unit including a sleeve located inside said heat pipe, and

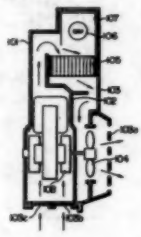
(6) a pressure control unit connected to said outlet fluid line.

4,955,208

REFRIGERATING APPARATUS HAVING A STINK REMOVING DEVICE

Masaei Kawashima; Reishi Naka; Teruo Tsunoda, all of Tochigi; Nobuyoshi Suenaga, Oyama; Syozo Ogawa; Masaaki Kashiwabuchi, both of Tochigi; Miyakichi Kameda, Sano, and Kousuke Tanaka, Tochigi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 295,754, Jan. 11, 1989. This application Jan. 8, 1990, Ser. No. 461,928
Claims priority, application Japan, Jan. 22, 1988, 63-10601; Jan. 22, 1988, 63-10602
Int. Cl.[5] F25D *23/00*
U.S. Cl. 62—264 **6 Claims**



1. A refrigerating apparatus comprising

means for constituting a refrigerating space,

cooling means for cooling air in said refrigerating space, and

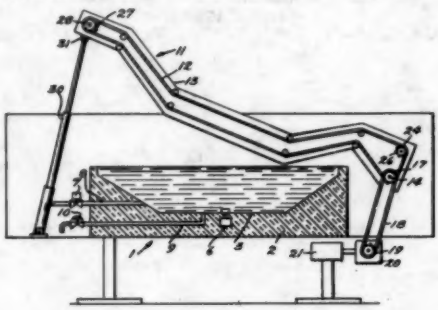
stink removing means for removing stink ingredient in said air comprising absorbent, a layer of photocatalyst provided on a surface of said absorbent and excited by light and a light source for exciting said photocatalyst disposed in a flow passage for said air.

4,955,209

CRYOGENIC BATH FREEZER WITH PIVOTED CONVEYOR BELT

Bryan K. Smith, Huntington Beach, Calif., assignor to Cryo-Chem Inc., Carson, Calif.

Filed Nov. 1, 1989, Ser. No. 430,005
Int. Cl.[5] F25D *25/04*
U.S. Cl. 62—380 **18 Claims**



1. A cryogenic freezer comprising a thermally insulated cabinet interiorly shaped to provide a vessel having a bottom and at least two sloping sides, a cryogenic bath maintained at a predetermined level in said vessel, a conveyor assembly having first and second end support sections and a medial section having a bottom section and at least two sloping side sections matching the profile of said bottom and at least two sloping sides of said vessel, said conveyor assembly being supported with said medial section immersed in said bath, said first sup-

port end section of said conveyor assembly being pivotally mounted in said cabinet, and power means to rotate said conveyor assembly around said pivotally mounted end section to raise said medial section above said bath level.

4,955,210

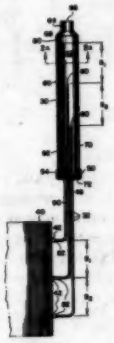
CAPILLARY TUBE ASSEMBLY AND METHOD OF MANUFACTURE

William G. Hansen, Clarksville, Tenn., assignor to American Standard Inc., New York, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,811

Int. Cl.[5] F25B *41/06*

U.S. Cl. 62—511 **10 Claims**



1. A refrigeration system comprised of:

a compressor having a suction port and a discharge port;

a condenser in flow connection with said discharge port;

a capillary tube assembly including a plurality of preformed substantially identical capillary tubes having capillary tube inlets and capillary tube outlets, a tube end cap defining a plurality of apertures for sealingly accepting said capillary tubes therethrough, and a tube assembly body defining an interior having a portion of said preformed capillary tubes therein, said tube assembly body having a first aperture defining an inlet and a second aperture defining an outlet having said tube end cap sealingly secured thereacross, said inlet in flow connection with said condenser;

an evaporator having a plurality of spaced apart evaporator inlets and an evaporator outlet, each said evaporator inlet in flow connection with one of said capillary tube outlets, said evaporator outlet in flow connection with said compressor suction port.

4,955,211

CIRCULAR KNITTING MACHINE FOR PRODUCING SINGLE FACE PLUSH ARTICLES

Paul Neher, Messstetten, Fed. Rep. of Germany, assignor to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH, Albstadt, Fed. Rep. of Germany

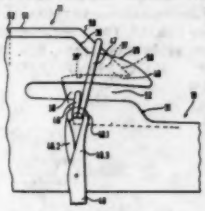
Filed Aug. 17, 1988, Ser. No. 233,274

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727318

Int. Cl.[5] D04B *9/12, 15/06*

U.S. Cl. 66—9 R **3 Claims**

1. A circular knitting machine for producing a single face plush article of base threads and plush threads, comprising a needle cylinder provided with a plurality of needles; a plate ring provided with separately controlled and differently shaped plates including a first plate which has a slot for receiving a base thread and a stepped ridge for applying a plush thread, and a second plate provided with a recess in the region of said slot of said first plate, said second plate having a plate tip formed above said recess and being provided for a plaiting with a plush thread-pressing edge which is formed on said plate tip and extends in an inclined manner relative to said slot



of said first plate and to a shaft of an associated one of said needles, said plush thread pressing edge being positionable in the vicinity of a step of said stepped ridge of said first plate.

4,955,212

APPARATUS FOR TREATING A TEXTILE WEB WITH A LIQUID

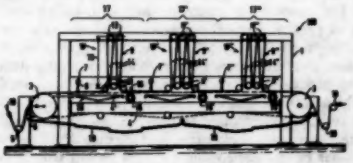
Johannes Kutz, Tönisvorst, and Günter von Harten, Kaarst-Buttgen, both of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Continuation of Ser. No. 919,223, Oct. 15, 1986, abandoned. This application Jul. 14, 1988, Ser. No. 219,802

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1985, 3536912; Sep. 9, 1986, 3630592

Int. Cl.[5] D06B *1/02, 15/04*

U.S. Cl. 68—9 **10 Claims**



1. An apparatus for washing or rinsing a dyed or printed textile web with a wash or rinse liquid, comprising:

conveyor means including an endless sieve belt for transporting said textile web along a predetermined substantially horizontal path;

applicator means disposed at a first station along said path for applying said wash or rinse liquid to said web during motion thereof along said path;

suction means disposed at a second station along said path at a point downstream of said first station for removing said wash or rinse liquid from said web by a suction process during motion of said web along said path, said suction means extending transversely to said belt and said web; and

dwell stretch means, disposed between said applicator means and said suction means, for conducting said textile web in a spread out condition and in a single layer through at least one dwell loop thereby increasing the time period said wash or rinse liquid acts upon said web, said dwell loop extending a substantial distance away from said path in a direction substantially perpendicular thereto.

4,955,213

FULL AUTOMATIC ELECTRIC WASHING MACHINE HAVING AN AUTO-OFF POWER SOURCE STRUCTURE

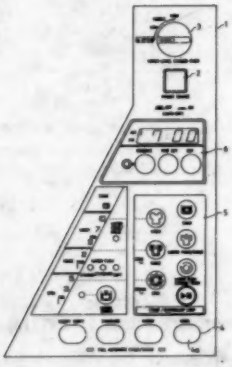
Hiroshi Ohsugi; Hiroyuki Toshimitsu; Toshiyasu Kamano, all of Hitachi; Tamotu Shikamori, Juou, and Masayoshi Hirayama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,356

Claims priority, application Japan, Feb. 19, 1988, 63-35266

Int. Cl.[5] D06F *33/02*

U.S. Cl. 68—12 R **25 Claims**



18. A full automatic electric washing machine having an auto-off power source structure comprising an auto-off power source switch provided on a panel control portion of a main body of said full automatic electric washing machine, means for controlling said auto-off power source switch, a first outside operation portion comprising buttons for indicating a plurality of full automatic cycles, and a second outside operation portion comprising buttons for indicating a plurality of washings and for displaying degrees of said plurality of washings, wherein when a washing process has been finished, said means for controlling controls said auto-off power source switch to present the off-condition, wherein said means for controlling further controls said auto-off power switch such that when an abnormal washing condition occurs during said washing process, said second outside operation portion displays the abnormal washing condition and said auto-off power source switch is controlled to present an off condition after a first predetermined shelf time, and further after the washing process has been finished said auto-off power source switch is controlled to present the off condition after a second predetermined shelf time.

4,955,214

RAM PRESS FOR PRESSING LIQUID OUT OF MATERIAL BEING PRESSED

Friedrich Geiger, Heilbronn-Frankenbach, Fed. Rep. of Germany, assignor to Passat-Maschinenbau GmbH, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 350,698

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816372

Int. Cl.[5] D06F *47/06*

U.S. Cl. 68—242 **16 Claims**

14. A ram press for pressing liquid out of a material comprising:

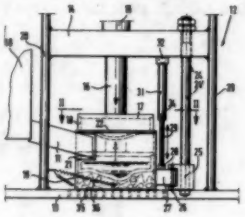
a container for the material having an open top;

a perforated base means associated with said container;

pressing means having a central vertical axis;

first mounting means for mounting said pressing means above said open top of said container for a movement along a path parallel to said vertical axis;

second mounting means for mounting said container for a movement with two degrees of freedom substantially perpendicularly to said vertical axis of said pressing means between a position in which said open top of said container is not aligned with said pressing means and an aligned position in which said open top of said container is aligned with said pressing means so that said pressing means can be introduced through said open top into said container; and



first driving means for driving said pressing means between a position in which said pressing means is out of said container and a position in which said pressing means penetrates said container when said open top of said container is aligned with said compressing means to compress material in said container between said pressing means and said perforated base means.

4,955,215

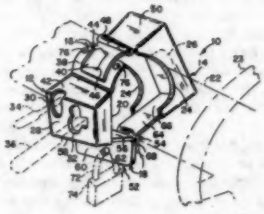
ANTI-THEFT STEERING COLUMN CUFF DEVICE FOR AUTOMOBILES AND THE LIKE

Nunzio Eremita, 2 Radcliff Rd., Staten Island, N.Y. 10305

Filed Oct. 16, 1989, Ser. No. 422,036

Int. Cl.[5] E05B *17/14*

U.S. Cl. 70—18 **2 Claims**



1. An anti-theft cuff device for a motor vehicle having a steering wheel and a steering column with an ignition switch, said device comprising:

(a) a first box shaped casing having an open side to fit against one side of the steering column;

(b) a second box shaped casing having a curved open side to fit against opposite side of the steering column so as to cover and protect the ignition switch;

(c) a hasp member extending between said first box shaped casing and said second box shaped casing so as to removably connect said first box shaped casing to said second box shaped casing on the steering column, wherein said hasp member includes:

(i) a curved plate having a hooked projection thereon, said curved plate being attached to and extending away from an end wall at said open side of said first box shaped casing; and

(ii) a curved strap having a slot therethrough and hinged to an end wall at said open side of said second box

shaped casing so that said slot can fit over said hooked projection to be removably connected thereto; and

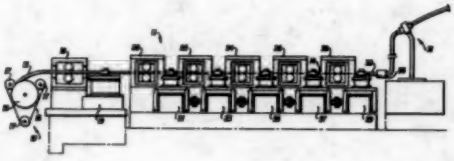
(d) means extending between said first box shaped casing and said second box shaped casing opposite said hasp member, for locking said cuff device to the steering column to prevent an unauthorized person from operating the ignition switch, wherein said first box shaped casing includes a base wall, opposite said open side thereof, having two openings therethrough, so that a tilt lever on the steering column can extend through one of said openings while a signal lever on the steering column can extend through the other of said openings.

4,955,216

METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING SOLUBLE OIL FLOW RATES TO CONTROL METALLURGICAL PROPERTIES OF CONTINUOUSLY ROLLED ROD

George W. Barker; Michael G. Crumpler, both of Carroll County, Ga.; James W. Peters, Perry County, Ind., and Delmar R. Hughey, Davies County, Ky., assignors to Southwire Company, Carrollton, Ga.

Filed Jan. 29, 1988, Ser. No. 150,216
Int. Cl.[5] B21B *37/00, 45/02*
U.S. Cl. 72—10 **41 Claims**



1. In continuous metal rod rolling apparatus for hot-forming having multiple rolling stands, a metallurgical property control system comprising:

means for supplying a flow of cooling and lubricating fluid to the rod;

nozzle means for spraying the fluid onto said rod;

valve means connected between said supplying means and said nozzle means for regulating the flow rate of fluid sprayed onto said rod;

positioning means coupled to said valve means to positionally control the adjustment of said valve means;

at least one historical data base having stored therein product specifications and historical process parameters associated with the product specifications;

computer means (i) for communicating control parameters to said positioning means, (ii) for receiving rod sample property values, (iii) for maintaining said historical data bas, and (iv) for performing off-line simulations to determine whether process and control parameter changes will bring the rod within product specifications; and

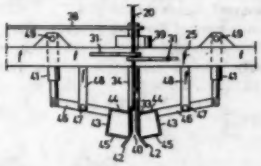
historical data generating means communicating with said computer means for providing said computer means with information reflecting at least a value of one metallurgical property of said rod so that said computer means can correctly position said valve means to obtain a desired predetermined value of said metallurgical property.

4,955,217

WIRE COILING ARRANGEMENT

Erich Guggenberger, Geneva, Switzerland, and Ebbe Hodén, Mariefred, Sweden, assignors to Sunds Defibrator AB, Sundsvall, Sweden

PCT No. PCT/SE88/00319, § 371 Date Jan. 17, 1990, § 102(e) Date Jan. 17, 1990, PCT Pub. No. WO88/09763, PCT Pub. Date Dec. 15, 1988
PCT Filed Jun. 13, 1988, Ser. No. 438,475
Claims priority, application Sweden, Jun. 12, 1987, 8702461-8
Int. Cl.[5] B21F *3/04*
U.S. Cl. 72—134 **7 Claims**



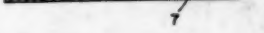
1. A wire coiling arrangement comprising a rotatable wire coiling mandrel (34) which incorporates a wire receiving slot (33) which extends at least substantially axially rearwards from a forward end of the mandrel and which has a slot mouth (40) which faces said forward end of the mandrel, and further comprising an ejection arrangement (43–46) which can be moved between a withdrawn wire coiling position (FIG. 5) and a forwardly located coil ejection position (FIG. 6), such as to push a wire coil (35) coiled on the mandrel axially therefrom, characterized in that the coil ejection arrangement (43–46) is arranged for axial movement along the mandrel (34) and, for the purpose of facilitating insertion of a wire (20) into the wire receiving slot (33), carries wire guides (42) which in one setting (FIG. 4) of the ejection arrangement form a continuation of the slot mouth (40) which widens in a direction away from the forwardly located end of the mandrel.

4,955,218

METHOD OF MANUFACTURING A HIGH TEMPERATURE COMPOSITE GASKET INCLUDING A STRIP SEGMENT OF NON-WOVEN FIBROUS REFRACTORY MATERIAL

Louis Brandener, Poissy, France, assignor to Jacques Dubois, Barentin, France

Filed May 27, 1987, Ser. No. 55,557
Claims priority, application France, Jun. 2, 1986, 86 07878
Int. Cl.[5] B29C *53/56;* B32B *31/06;* F16J *15/12*
U.S. Cl. 72—146 **5 Claims**



1. A method of manufacturing an annular resilient high temperature composite gasket comprising the steps of forming a strip of composite material comprising at least one flexible strip of refractory material superposed on at least one strip of knitted metal, making a blank by winding the strip of composite material into a winding comprising at least one turn, the flexible strip of refractory material including at least one strip segment comprised of refractory fibers formed into a non-woven material with said non-woven material occupying at least one turn of the winding, and at least one strip segment of non-fibrous refractory material forming at least one turn of the

winding, and compressing the winding in an axial direction thereof so as to form an annular gasket wherein, in axial cross section, said flexible strip of refractory material forms a fibrous refractory portion which is at least partially surrounded by a non-fibrous refractory portion and the winding is compressed to a degree sufficient to enable dry frictional movement between fibers of the fibrous refractory portion while the knitted metal remains resilient and at least partially surrounds the refractory portions.

4,955,219

ROCK BOLT

Moshe Josef, Bruma, and David Wiesenfeld, Givataim, both of South Africa, assignors to Videx-Wire Products (Proprietary) Limited, Transvaal, South Africa

Continuation-in-part of Ser. No. 119,441, Nov. 12, 1987, abandoned. This application Aug. 8, 1989, Ser. No. 390,904

Claims priority, application South Africa, Nov. 14, 1986, 86/8649; Sep. 11, 1987, 87/6810

Int. Cl.[5] B21H *8/02*

U.S. Cl. 72—187 **6 Claims**

1. A method of making a rock bolt with a thread on a section thereof comprising the steps of;

providing a metal bar of circular or near circular cross-section having a diameter which is substantially equal to the pitch diameter of the thread to be provided thereon;

passing the bar in a single pass between a pair of rolls to pinch the bar at intervals to cold form protrusions spaced from one another in staggered formation on opposite sides of the bar along a selected section thereof;

displacing one or more of said rolls away from the other at a selected time to ensure that said protrusions are formed only on said selected section of bar;

straightening the bar in its cold condition; and

cold rolling a thread with the said pitch diameter on a further selected section of the bar which is free of the said protrusions.

4,955,220

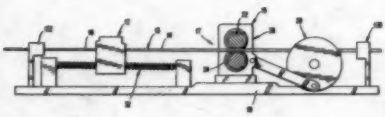
LOW INERTIA MECHANISM FOR REPOSITIONING A WORKPIECE IN A ROCKER MILL

Anthony A. Duerring, Kennewick, Wash., assignor to Sandvik Special Metals Corporation, Kennewick, Wash.

Filed Nov. 22, 1989, Ser. No. 440,101

Int. Cl.[5] B21B *21/04*

U.S. Cl. 72—214 **7 Claims**



1. In a rocker mill including a rollstand and repositioning means for repositioning a longitudinally elongated member which includes a workpiece extending through said rollstand, said supporting means comprising:

a stationary feedscrew oriented in a longitudinal direction,

guide means oriented in said longitudinal direction,

a carriage mounted on said guide means for movement in said longitudinal direction toward said rollstand,

a first hollow-shafted electric motor mounted on said carriage and including a first hollow open-ended rotor through which said stationary feedscrew passes,

a threaded nut through which said stationary feedscrew passes, said threaded nut being connected to said first hollow-shafted electric motor to be rotated thereby relative to said feedscrew in order to move said carriage longitudinally along said guide means,

a second hollow-shafted electric motor mounted on said carriage and including a second hollow open-ended rotor through which the elongated member is adapted to pass,

a clamp through which the elongated member is adapted to pass, said clamp including displaceable clamp jaws connected to said second rotor for rotation therewith, and

clamp actuating means mounted on said carriage and operably connected to said clamp jaws for displacing said clamp jaws into clamping engagement with the elongated member for transmitting rotary movement thereto from said second rotor and for transmitting longitudinal movement thereto from said threaded nut.

4,955,221

ROLLING MILL FOR MAKING A ROLLED PRODUCT, ESPECIALLY ROLLED STRIP

Hugo Feldmann, Alsdorf-Warden; Tilmann Schultes, Solingen, and Gerd Beisemann, Düsseldorf, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

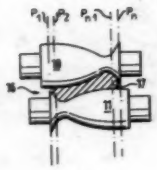
Continuation-in-part of Ser. No. 62,740, Jun. 15, 1987, Pat. No. 4,800,742. This application Nov. 2, 1988, Ser. No. 266,094

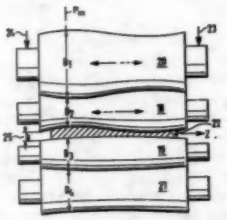
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1986, 3620197

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[5] B21B *27/02, 31/18, 29/00*

U.S. Cl. 72—247 **19 Claims**





1. A rolling mill for rolling flat stock comprising a plurality of rolls including a pair of working rolls defining a rolling gap between them, at least one of said rolls being axially shiftable relative to another of said rolls to control the shape of said gap and having a roll body which is continuously curved over an entire length thereof, all of said rolls having roll bodies rotatable about respective axes and said roll bodies having diameters in common planes perpendicular to said axes forming respective sums, the shapes of said roll bodies being such that said sums as determined axially along said roll bodies deviate from a constant value in all relative axial positions of said

bodies in accordance with a nonlinear mathematical function different from zero.

4,955,222

DEFORMING PANELS HAVING RIBS

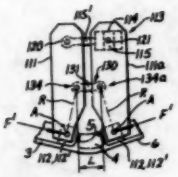
Helmut Reccius, Munich, Fed. Rep. of Germany, assignor to Dornier Luftfahrt GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Mar. 16, 1989, Ser. No. 324,548

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808763

Int. Cl.[5] B21D *11/20*

U.S. Cl. 72—295 16 Claims



1. Device for the bending and deformation of panels for covering cells of vehicles in the aerospace industry, said having inwardly directed stiffening ribs which intersect in nodes, the device having first and second deforming members being capable of engaging said panels in points adjacent to nodes under consideration of length changes obtained by some of the ribs; the improvement comprising:

said deforming members carrying clamping bracket pairs for engagement of adjacent nodes, said clamping bracket pairs being freely pivotable under utilization of pivot pins arranged transversely to the plane of pivoting;

means connected to said device for applying forces to the deforming members so that the deforming members are enabled to obtain the bending and deformation of the respective panel; and

means for independently adjusting the orientation of said two deforming members in relation to each other such that the deforming forces respectively provided into the respective panel to be deformed are oriented in the area of the nodes transversely or nearly transversely to those ribs which extend transversely to the curvature to be obtained and consistently tangentially to the panel in the direction of curvature and following change of curvature on account of bending; and

means for varying the direction of force action as provided by said deforming members into the panel such that these forces as provided by said two deforming members do not have to act coaxially in relation to each other.

4,955,223

METHOD AND APPARATUS FOR FORMING A CAN SHELL

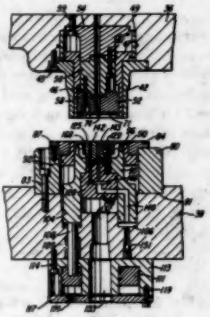
Ralph P. Stodd, Dayton, and Harry D. Stewart, Tipp City, both of Ohio, assignors to Formatec Tooling Systems, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 296,951, Jan. 17, 1989, abandoned. This application Nov. 15, 1989, Ser. No. 436,724

Int. Cl.[5] B21D *51/44*

U.S. Cl. 72—336 21 Claims

1. A method of forming a cup-shaped can end wall or shell from a flat metal sheet, the shell including a center panel portion having a peripheral panel radius and connected by a panel wall portion to a countersink portion having a countersink radius and with the countersink portion connected to a crown portion by a chuck wall portion, the method comprising the steps of blanking a disk from the sheet, gripping a peripheral portion of the disk, moving the peripheral portion axially in one direction relative to a center portion of the disk supported by a center panel punch to define the center panel portion and the panel wall portion with the panel wall portion connected by an inverted chuck wall portion to the peripheral portion,



deforming the peripheral portion to define the crown portion, and moving the center panel punch and the center panel portion axially in the same direction and relative to the crown portion to reverse form the inverted chuck wall portion into the chuck wall portion and the countersink portion.

4,955,224

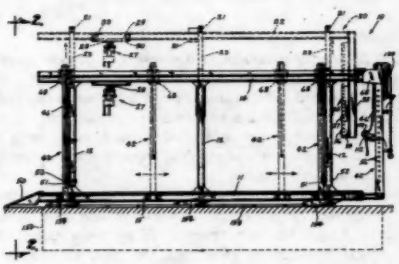
ADJUSTABLE HEIGHT VEHICLE FRAME STRAIGHTENING APPARATUS

Carl R. Field, Treasure Island, Fla., assignor to Duz Mor, Inc., Des Moines, Iowa

Filed Jul. 13, 1989, Ser. No. 379,334

Int. Cl.[5] B21D *1/12*

U.S. Cl. 72—457 5 Claims



1. Vehicle repair apparatus comprising:

vehicle supporting means for supporting the wheels of a vehicle to be repaired;

at least one tower means for pulling on parts of a vehicle disposed on said vehicle supporting means, said tower means having an upper end and a lower end;

a lower tower support disposed around a portion of said vehicle supporting means;

an upper tower support disposed upwardly from said vehicle supporting means and at approximately the same height as the upper end of said tower means;

upwardly extending members rigidly attached at the bottom thereof to said vehicle supporting means and at the top thereof to said upper tower support;

means for selectively attaching the upper end of said tower means to said upper tower support;

means for permitting said upper end of said tower means to

move in a horizontal direction with respect to said upper tower support;

means attached to the lower end of said tower means and engaging said lower support for permitting said lower end of said tower means to move horizontally with respect to said lower tower support;

an upper framework;

downwardly extending members operably connected to said upper framework, said downwardly extending members being disposed in a sliding relationship with said upwardly extending members for permitting said upper framework to be lowered for transporting said vehicle repair apparatus from place to place; and

means associated with said downwardly extending members for holding said upper framework in an upper working position so as to provide adequate clearance for relatively high vehicles to be disposed on said vehicle supporting means.

4,955,225

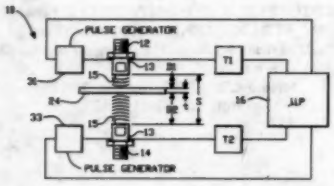
AUTOMATIC CALIBRATION METHOD FOR THICKNESS GAUGES

James N. Kniest, Edmonds, and Dean D. Campbell, Seattle, both of Wash., assignors to Ultrasonic Arrays, Inc., Woodinville, Wash.

Continuation of Ser. No. 104,420, Oct. 2, 1987, Pat. No. 4,823,590. This application Apr. 11, 1989, Ser. No. 298,482

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—1 J **4 Claims**



1. A device for measuring a dimension of objects traveling along a path comprising:

a pair of spaced apart probes located on opposite sides of the path and each having an ultrasonic transducer;

pulse generator means connected to the transducer in each of said probes for causing said transducers to selectively emit ultrasonic signals;

controller means connected to the pulse generator means for instructing the pulse generator means to initiate transmission of signals from the probes and for measuring the time period between emission and reception of each signal generated to determine the separation between the probes, said controller means including means for determining if an object is present, and if an object is present calculating the thickness of the object, and if an object is not present determining the separation between said probes by calculating the distances traveled by the signals from the probes to provide an updated separation between the probes.

4,955,226

METHOD AND APPARATUS FOR AUTOMATICALLY DETECTING THE PRESENCE OF HOLES IN FILLED AND SEALED PACKED PLASTIC BAGS

Dennis W. Beaty, Arlington, and C. Brooks Shafer, Dallas, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Dec. 26, 1984, Ser. No. 686,549

Int. Cl.[5] G01M *3/36*

U.S. Cl. 73—49.3 **3 Claims**

1. An in line apparatus for detecting the presence or absence of holes in sealed plastic bags filled with product and gas, the apparatus comprising:

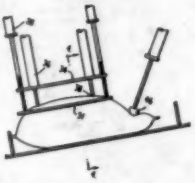
(a) a sensing member carrier carrying one or more displaceable sensing members;

(b) means for positioning a filled and sealed bag to be inspected accurately with respect to the sensing members;

(c) fluffing means for contacting the bag and applying positive pressure to the bag;

(d) means for moving the sensing member carrier towards a surface of the bag to a predetermined position to place the sensing members in contact with the bag under uniform pressure for a predetermined time;

(e) means for detecting the amount of displacement of the sensing members upon movement of the carrier to said predetermined position so as to provide a test value for



said amount of displacement, the detecting means further detecting change in displacement over time of the sensing members over a predetermined period of time while the sensing member carrier is at said predetermined position so as to provide a test value for said change of displacement over time; and

(f) means for comparing the test value for the amount of displacement and the test value for the change in displacement over time of the sensing members to predetermined corresponding values obtained with control bags, the comparing means being programmed to reject bags with which the sensing members are displaced less than a predetermined amount, said comparing means further being programmed to reject bags with which the change in displacement over time of the sensing members exceeds a predetermined rate.

4,955,227

APPARATUS FOR INSPECTING GLASS BOTTLES

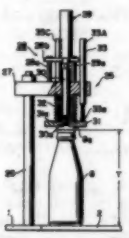
Toshiki Fujita, Tokyo; Hirokazu Kimura, and Yoshihiro Yamato, both of Yokohama, Japan, assignors to Toyo Garasu Kabushiki Kaisha, Tokyo, Japan

Filed May 25, 1988, Ser. No. 209,952

Claims priority, application Japan, May 27, 1987, 62-130475; Aug. 20, 1987, 62-205214; Aug. 27, 1987, 62-214082

Int. Cl.[5] B07C *5/34*

U.S. Cl. 73—104 **5 Claims**



3. An apparatus for inspecting a down sealing surface of a glass bottle, comprising:

an inspecting operation table;

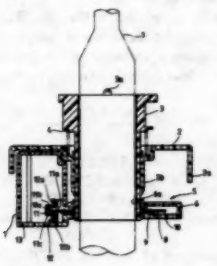
a support column extending vertically upward from said operation table;
a support member extending horizontally from an upper portion of said support column;
a piston-cylinder assembly having a vertically reciprocable piston rod;
a measuring plate swingably supported on the outer end of said piston rod;
a coil spring disposed between said measuring plate and said support member; and
a plurality of linear gauges mounted on said support member, said gauges equally circumferentially spaced in a circle, and said gauges having gauge probes for contacting a back surface of said measuring plate to measure the distance from a reference point to said back surface.

4,955,228

DEVICE FOR DETECTING ROTATION OF STEERING WHEEL FOR AUTOMOBILES

Hitoshi Hirose, and Kazuo Kouno, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Continuation of Ser. No. 397,369, Aug. 23, 1989, abandoned, which is a continuation of Ser. No. 278,916, Dec. 2, 1988, abandoned. This application Nov. 14, 1989, Ser. No. 436,947
Claims priority, application Japan, Dec. 3, 1987, 62-184633[U]
Int. Cl.[5] G01M 19/00
U.S. Cl. 73—118.1 **6 Claims**



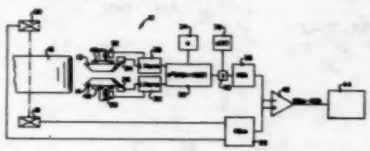
1. A device for detecting rotation of a steering wheel and steering shaft for motor vehicles, comprising:
a cylindrical connecting member rotatable with the steering wheel and having a projection for engagement with the steering shaft and a radially extending lip;
an encoding member rotatable together with the steering shaft and the steering wheel and having markers at predetermined positions;
a sensor disposed adjacent a locus of rotation of said markers;
signal generating means for receiving information from said sensor and for generating pulse signals representative of information on the rotation of said encoding member each time said encoding member is rotated past said sensor;
a base having an inner cylindrical wall concentric with both said connecting member and the steering shaft and an outer cylindrical wall spaced a predetermined distance from said inner wall, said connecting member and the steering shaft being rotatable within said base;
a storing interposed between said base and said radially extending lip of said connecting member;
a first casing for housing said encoding member, said encoding member being rotatable at least partially within said first casing;
a second casing for housing and holding said signal generating means, said second casing being integrally formed with said first casing, said second casing having a lower portion and an upper portion and being disposed beneath said base between said inner and outer walls thereof; and
an arm mounted within said second casing on said lower portion, said arm having a substantially u-shaped central area extending about the edge of said encoding member, said sensor being disposed on said arm adjacent to a locus of rotation of said markers.

4,955,229

METHOD AND APPARATUS FOR DETERMINING THE UNIFORMITY OF PNEUMATIC TIRES

Günther Hinsler, Darmstadt, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany

Filed Oct. 20, 1989, Ser. No. 424,107
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1988, 3835985
Int. Cl.[5] G01M 17/02
U.S. Cl. 73—146 **19 Claims**



10. An apparatus for determining the uniformity of pneumatic tires comprising:
a measuring rim, on which a pneumatic tire to be tested can be mounted;
a measuring system for measuring force fluctuations that result when the tire is rolled on a contact surface of a testing apparatus and emitting a corresponding measurement signal;
a measuring rim scanner for scanning the measuring rim, the scanner furnishing preliminary error signals corresponding to the eccentricities of the measuring rim;
a signal processing system using the preliminary error signals to calculate a resultant error signal and then multiplying the resultant error signal by a value corresponding to a rigidity of the tire to attain a correction signal;
means for receiving both the measurement signal and the correction signal and for subtracting the correction signal from the measurement signal; and
an evaluation system operatively connected to said subtracting means which evaluates the subtracted measurement signal furnished by the subtracting means to determine tire uniformity.

4,955,230

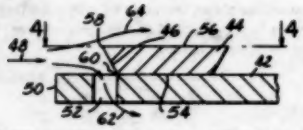
ELIMINATION OF TURBULENCE FOR SILICON MICROMACHINED AIRFLOW SENSOR

Bryan C. Hall, Newport News, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Aug. 7, 1989, Ser. No. 390,597
Int. Cl.[5] G01F 1/68
U.S. Cl. 73—204.21 **5 Claims**

1. In a solid-state mass airflow sensor comprising a substrate having a surface containing a semi-conductor sensing element, said semi-conductor sensing element having a leading edge surface in the direction of airflow and a flat exposed sensing surface extending downstream from said leading edge, the improvement which comprises a slot through said substrate just forward of and generally parallel with said leading edge surface so that a portion of the airflow toward said leading

edge surface is caused to pass through said slot and thereby promote smooth flow over said exposed sensing surface to enhance the accuracy of the sensing element in measuring mass air flow.

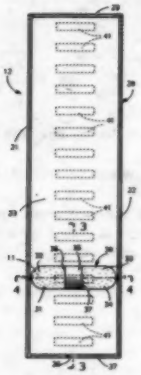


4,955,231

LIQUID FLOAT GAGE ASSEMBLY

Christopher J. Mahoney, Birch Run, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 12, 1989, Ser. No. 351,105
Int. Cl.[5] G01F 23/72
U.S. Cl. 73—313 **3 Claims**



1. In a liquid float gage assembly for a vehicle mounted liquid reservoir comprising a vertical tube open at the bottom for liquid communication with the reservoir so that the liquid level in the tube varies with that in the reservoir, a plurality of horizontally aligned magnetically responsive sensors disposed in vertically spaced arrangement adjacent the tube and a level therein, the float being capsule shaped with an extended round cylindrical portion having rounded axial ends and comprising a magnet sensed by the nearest of the magnetically responsive sensors and attracted thereto so as to bias the float to an inner surface of the tube adjacent the sensors, the improvement comprising:

the tube having a horizontally cross-sectional shape substantially matching and just larger than an axial section of the float so that the float has a stable floating orientation with a single horizontal axis and is capable of rolling against the inner surface of the tube adjacent the sensors with minimal friction during vertical movement within the tube due to changes in liquid level; and

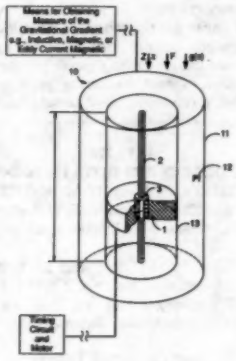
the magnet being annular about the axis of the float and having poles at axially opposing ends thereof and further having a circumferentially consistent spacing relative to the outer surface of the float so as to provide a substantially non-varying magnetic field strength and orientation relative to the horizontally aligned magnetically responsive sensors as the float rolls.

4,955,232

FLOATED GRAVITY GRADIOMETER AND METHOD

Theodore V. Lautzenhiser, Tulsa, Okla., and Melvin Eisner, Houston, Tex., assignors to Amoco Corporation, Chicago, Ill.

Filed May 31, 1989, Ser. No. 359,454
Int. Cl.[5] G01V 7/02
U.S. Cl. 73—382 G **6 Claims**



1. A gravity gradiometer, comprising:

a housing containing a fluid;

a float buoyantly supported within the fluid;

means for varying the metacentric height of the float; and

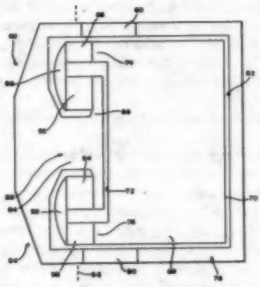
means for obtaining a measure of the gravitational gradient acting on the float resulting from varying the metacentric height.

4,955,233

PENDULOUS ASSEMBLY FOR USE IN AN ACCELEROMETER

Richard A. Hanson, 21220 NE. 156th St., Woodinville, Wash. 98072

Continuation-in-part of Ser. No. 899,975, Aug. 25, 1986, abandoned. This application Jul. 19, 1988, Ser. No. 221,116
Int. Cl.[5] G01P 15/08
U.S. Cl. 73—497 **29 Claims**



1. A pendulous assembly for use in an accelerometer or other such device including an arrangement for sensing forces acting on the device in a particular direction, said assembly comprising:

(a) a proofmass;

(b) means forming part of said sensing arrangement and carried by or in direct engagement with said proofmass

for specifically sensing said forces acting on said proofmass; and

(c) means supporting one end of said proofmass for pivotal movement about a given axis back and forth through a resting plane which contains said proofmass when the proofmass is at rest in the absence of any of said forces, said supporting means including

(i) a frame and means for mounting the frame to a main support forming part of the force sensing device;

(ii) an isolation bridge;

(iii) isolation bridge flexure means connecting said isolation bridge with a section of said frame for pivotal movement of said isolation bridge means back and forth about a given axis; and

(iv) proofmass flexure means separate from and substantially unconnected with said isolation bridge flexure means, said proofmass flexure means connecting said proofmass with said isolation bridge means for pivotal movement of said proofmass back and forth about a given axis;

(d) said isolation bridge flexure means and the proofmass flexure means being connected to one side of said isolation bridge such that the other side thereof is free-floating; and

(e) said isolation bridge means including two spaced-apart, laterally aligned isolation bridges, said isolation bridge flexure means including a first isolation bridge flexure means connecting one of said isolation bridges with said frame section and a second isolation bridge flexure means connecting the other isolation bridge with the frame section, and said proofmass flexure means including a first proofmass flexure connecting said one isolation bridge with said proofmass and a second proofmass flexure means connecting the other isolation bridge with said proofmass.

4,955,234

SENSOR

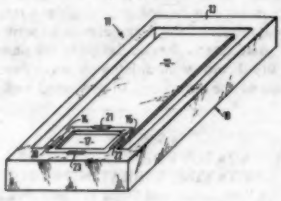
Jiri Marek, Reutlingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 24, 1989, Ser. No. 328,936

Claims priority, application Fed. Rep. of Germany, May 3, 1988, 3814952

Int. Cl.[5] G01P *15/12*

U.S. Cl. 73—517 R **9 Claims**



1. A sensor for measuring acceleration of a vehicle and generating a control signal in response to deviation of the vehicle from a permissible course of movement for automatic release of vehicle occupant protective means, said sensor comprising a support formed as a silicium plate; a pendulum with a seismic mass; two spaced bending bars for supporting said pendulum on said support; two resistances arranged on said bending bars, respectively; and two further resistances arranged on said pendulum and said support, respectively, in a region between said two bending bars, said two resistances and said two further resistances being connected in a Wheatstone bridge.

4,955,235

APPARATUS AND METHOD FOR PROVIDING A COMBINED ULTRASONIC AND EDDY CURRENT INSPECTION OF A METALLIC BODY

Michael J. Metala; William G. Clark, Jr., both of Murrysville; Warren R. Junker, Monroeville; Lee W. Burtner, Elizabeth Township, Allegheny County; Thomas E. Arzenti, Greensburg; Harold P. Johnson, Verona; Robert P. Vestovich, Monroeville, and Bruce W. Bevilacqua, Irwin, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

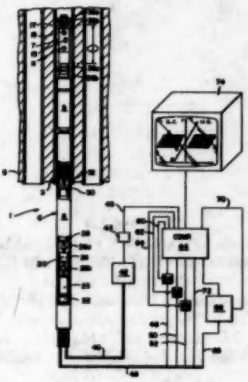
Division of Ser. No. 79,860, Jul. 30, 1987, Pat. No. 4,856,337.

This application Jun. 23, 1989, Ser. No. 369,725

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—601 **34 Claims**



1. An apparatus for inspecting the walls of a metallic body having an elongated opening therein with both ultrasound and eddy currents, comprising:

a. a housing assembly insertable within said elongated opening, and

b. a probe carrier rotatably connected to the housing assembly, including at least three ultrasonic probes for transmitting ultrasonic beams that are directly oriented radially, chordally and axially with respect to the longitudinal axis of the opening, and an eddy current probe for simultaneously generating eddy currents in the walls of the metallic body while the probe carrier is rotated.

4,955,236

METHOD FOR OBSERVATION OF VIBRATION MODE

Kenji Yokoyama, and Hidehiko Saizyo, both of Tokyo, Japan, assignors to NEC Environment Engineering Ltd., Tokyo, Japan

Filed Nov. 20, 1989, Ser. No. 439,292

Claims priority, application Japan, Nov. 22, 1988, 63-295389; Jul. 31, 1989, 1-198870

Int. Cl.[5] G01D *05/28*; G01H *13/00*

U.S. Cl. 73—655 **7 Claims**

1. A method for observation of vibration mode comprising the steps of:

applying treatment for preventing diffusion of heat generated on at least one face of a substance to be observed,

vibrating the substance to convert from vibrating energy to thermal energy,

detecting distribution of temperature on the surface of the

substance from the thermal radiant energy emitted on each part of said substance, and

displaying change of temperature distribution on each part of the substance corresponding to shape of the vibration mode as thermal imagery.

4,955,237

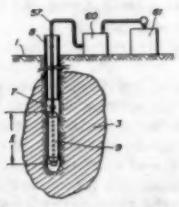
METHOD AND APPARATUS FOR MEASUREMENT OF IN-SITU HORIZONTAL STRESS BY FREEZING OF THE GROUND IN-SITU

Yoshio Suzuki; Munenori Hatanaka; Junryou Ohara, and Yorio Makihara, all of Tokyo, Japan, assignors to Takenaka Corp and Tokyo Soil Research Co., Ltd., Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 362,867

Int. Cl.[5] G01B *5/00*

U.S. Cl. 73—784 **14 Claims**



1. A device for indicating the in-situ stress in cohesionless soil, said device comprising

first means including a flexible member for being placed adjacent a respective surface of a frozen sample, and for establishing an initial contact at positive pressure between said flexible member and said respective surface of said frozen sample,

second means for controlling said positive pressure between said flexible member and said respective surface of said sample as said sample thaws, in a manner that counteracts and prevents displacement of said flexible member while said sample thaws,

wherein change of dimension of said sample during said thawing, as indicated by attempted displacement of said respective surface of said sample in a direction normal to the adjacent part of said flexible member as said sample thaws, is prevented by change in said positive pressure during said thawing, and the final value of said positive pressure after said sample is completely thawed is related to the in-situ stress in the soil.

4,955,238

OPTICAL SENSOR

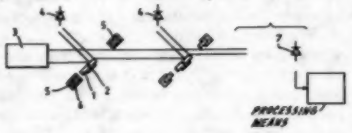
Roger E. Jones, Cambridge; Peter G. Hale, Chelmsford, and Jolyon P. Willson, Cambridge, all of Great Britain, assignors to STC PLC, London, England

Continuation-in-part of Ser. No. 33,067, Mar. 31, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,391

Claims priority, application United Kingdom, Jul. 12, 1986, 8617030

Int. Cl.[5] G01L *1/24*

U.S. Cl. 73—800 **9 Claims**



1. An opto-electrical sensor which includes:

a plate-like member of thin silicon which has a light-reflective surface and a magnetically soft layer on one of its surfaces;

torsion supports for said plate-like member so arranged that the plate-like member is capable of oscillation;

a coil which embraces said plate-like member and can be energised by an electrical current;

a light source from which a light beam is obtained, the light-reflective surface of the plate-like member being at least partially in the path of the light beam;

a photo-detector so located that when the reflective surface of the plate-like member is in the path of said light beam that light beam is reflected from the reflective surface on to the photo-detector; and

connections from the photo-detector to the coil whereby the coil is energised in response to the production of a current output from the photo-detector due to light reflected from said plate-like member reaching the photo-detector;

wherein the current thus applied to the coil applies a magnetic force to the plate-like member in such a way as to rotate that member out of the light beam;

wherein a parameter to be sensed and measured influences the plate-like member in such a way as to rotate the plate-like member into the beam; and

wherein the action of the photo-detector thus causes feedback to be applied magnetically to the plate-like member in such a way as to rotate it out of the beam, whereby the plate-like member is caused to oscillate at a rate dependent on the magnitude of the parameter to be sensed and measured, so that, due to the oscillation of the plate-like member the lightbeam is modulated in accordance with the magnitude of the parameter to be sensed and measured.

4,955,239

APPARATUS FOR ELECTRICALLY INTERCONNECTING VIBRATING STRUCTURES

Donald R. Cage, Longmont, and Dean E. Lowe, Boulder, both of Colo., assignors to Micro Motion, Inc., Boulder, Colo.

Continuation of Ser. No. 272,209, Nov. 17, 1988, abandoned, which is a continuation of Ser. No. 865,715, May 22, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 377,324

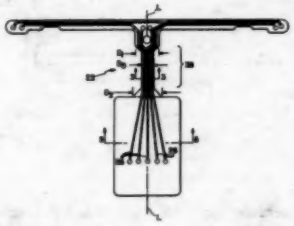
Int. Cl.[5] G01F *1/84*

U.S. Cl. 73—861.38 **10 Claims**

1. In a Coriolis mass flow meter which comprises a flow tube, mounting means for said flow tube, means for vibrating said flow tube with respect to said mounting means and means for sensing the deflection of said flow tube caused by fluid flow through said flow tube and for producing a signal representative of said deflection, support structure means mounted adjacent said flow tube for supporting said means for vibrating and said means for sensing;

a flexible circuit device attached to said support structure means and said mounting means and including affixed multiple electrical conductors for electrically interconnecting said means for vibrating and said means for sensing between said support structure means and said mounting means, which device further comprises:

(a) flexible insulating means affixed to said multiple electrical conductors for maintaining them in essentially parallel relationships in a plane over a first distance along the length of said electrical conductors, which



first distance is greater than the rectilinear distance between said mounting means and said support structure means; and

(b) stiffening means affixed to said insulating means at each end of said first distance and extending essentially to each of the locations where said device is attached to said mounting means and said support structure, which stiffening means act to maintain said first distance of said flexible circuit device in essentially a half-loop shape after said device is attached to said mounting means and said support structure.

4,955,240

VIBRATION TYPE FORCE DETECTOR

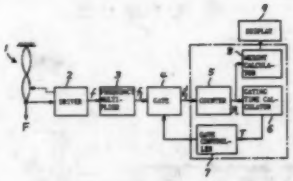
Akira Komoto, Fujio Okumachi, Japan, assignor to Shimadzu Corporation, Japan

Filed Sep. 26, 1989, Ser. No. 412,428

Claims priority, application Japan, Sep. 30, 1988, 63-248879

Int. Cl.[5] G01L *1/10*; G01G *3/16*

U.S. Cl. 73—862.59 **3 Claims**



1. A vibration type force detector comprising: a string to which a force to be measured is applied in the direction in which the string is tensioned; a driver for causing said string to vibrate at its natural frequency and simultaneously producing a series of pulses at a frequency in synchronism with the vibration of said string; a gate to which said series of pulses are applied; a counter for counting said series of pulses that have passed through said gate; means for providing a gating time determined in accordance with the result of the counting of said counter; and a controller for controlling said gate in accordance with said gating time; said gating time providing means being so arranged that as the vibration frequency of said string increases, said gating time lengthens.

4,955,241

MAGNETOELASTIC FORCE-MEASURING DEVICE

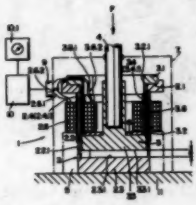
Edmund Schiessle, Schorndorf, and Khaldoun Alsaafi, Schwabisch Gmund, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jun. 5, 1989, Ser. No. 361,317

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819083

Int. Cl.[5] G01L *1/12*

U.S. Cl. 73—862.69 **15 Claims**



1. Magnetoelastic force-measuring device comprising a metallic annular thrust body of low elastomechanical hysteresis with magnetostrictive properties, which has mutually parallel end faces subjectable to the force to be measured, and bears a coaxially arranged exciting and measuring winding, wherein a metallic sleeved tension body is arranged to fit coaxially in the annular thrust body, here said sleeved tension body being likewise of low elastomechanical hysteresis and with magnetostrictive properties and being supported at its one end with an annular flange on the free end face of the annular thrust body which is not supported against an abutment, the other free end being provided with a receiver for introducing the force (F), wherein the magnetostrictive properties are formed by a thin, homogeneous, uniform, soft-magnetic measuring film which is applied, on the one hand, to the outer lateral surface of the annular thrust body and, on the other hand, to the inner lateral surface of the sleeved tension body, wherein the exciting and measuring winding of the annular thrust body is constructed as a ring coil and is arranged on the measuring film on the outer lateral surface of the annular thrust body, and wherein, in its interior, the sleeved tension body likewise bears a ring coil constructed as an exciting and measuring winding, which ring coil is arranged on the measuring film on the inner lateral surface of the sleeved tension body, the two ring coils being connected up to make an inductive half-bridge and being capable of being connected to an electronic apparatus for exciting and evaluating the differential inductance.

4,955,242

CONVEYOR BELT CROSS-STREAM SAMPLING SYSTEM AND ASSOCIATED METHOD

John B. Long, 421 Heron Hill Dr., Louisville, Tenn. 37777

Continuation of Ser. No. 363,544, Jun. 6, 1989, Pat. No. 4,919,000. This application Dec. 15, 1989, Ser. No. 452,113

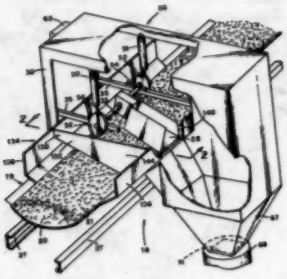
The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.[5] G01N *1/12*

U.S. Cl. 73—863.91 **8 Claims**

1. In a system for taking a sample of material carried on a moving conveyor belt wherein the sample is taken at a sampling location by passing a sampler across the belt through the moving material from an entry side of the belt to an exit side of the belt, the improvement which comprises means located upstream of the sampling location for limiting build-up of material against the sampler caused by the presence of the sampler within the flow of material so that only a predeter-

mined build-up of material against the sampler is permitted to thereby limit the thrust force exerted against the sampler by



the moving material in excess of that exerted when said predetermined build-up of material against the sampler is reached.

4,955,243

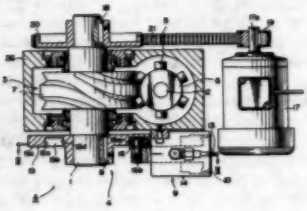
MOTION TRANSFORMING APPARATUS

Heizaburo Kato, Shizuoka, and Masao Nishioka, Fukaroi, both of Japan, assignors to Sankyo Manufacturing Company, Ltd., Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,679

Int. Cl.[5] F16H *27/04*

U.S. Cl. 74—84 R **10 Claims**



1. A motion transforming apparatus for transforming a continuous rotary motion of an input shaft into a motion of a predetermined type of an output shaft through a motion transmitting cam means, comprising:

torque compensating cam means including a cam connected to said input shaft and cam follower means, and

pneumatic cylinder means for applying load on said torque compensating cam means,

said pneumatic cylinder means including a cylinder into which gas is introduced, and piston means accommodated in said cylinder and connected with said cam follower means, said piston means being adapted to be pushed by the pressure of said gas introduced into the cylinder in such a direction as to maintain said cam follower means in contact with a cam surface of said cam and being movable reciprocatingly in the cylinder for compressing and expanding said introduced gas, and

wherein a fluctuating torque applied on said input shaft by the operation of said torque compensating cam means and the accompanying reciprocal motion of the piston in the cylinder compensate a fluctuating torque loaded on the input shaft by said motion transmitting cam means when the motion of the input shaft is transformed into the motion of the output shaft through the motion transmitting cam means.

4,955,244

OPERATING APPARATUS FOR CLEAN ROOM

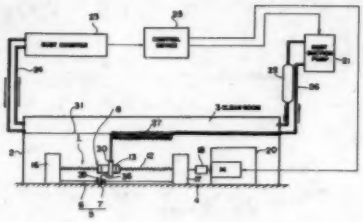
Masayuki Katahira, Maebashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,597

Claims priority, application Japan, Jul. 14, 1988, 63-175843

Int. Cl.[5] F16H *25/22*; B01D *53/30*

U.S. Cl. 74—89.15 **3 Claims**



1. In an operating apparatus for a clean room including a ball screw apparatus having a nut which is engaged with a driving rotary shaft of the ball screw apparatus for linearly moving a member to be operated in a clean environment, and means for sucking and removing dust produced in said ball screw apparatus, the improvement comprising:

a feed oil bore formed in the nut;

said sucking and removing means including a suction pipe connected to the feed oil bore; and wherein

grease plating is applied to the rotary shaft of said ball screw apparatus by dipping the rotary shaft into a solution of a volatile solvent containing a very small amount of grease dissolved therein and by drying the rotary shaft after removing the rotary shaft from the solution to thereby form a very thin coating of the grease on the surface of the rotary shaft.

4,955,245

GAS SPRING FOR ACTUATOR

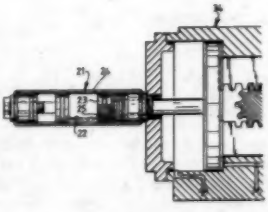
Hendrikus C. J. G. Janssen, Hengelo, and Joseph H. M. Tiehuis, Delden, both of Netherlands, assignors to Holland Hellas Holding B.V., Netherlands

Filed Feb. 10, 1989, Ser. No. 308,448

Claims priority, application Netherlands, Feb. 11, 1988, 8800340

Int. Cl.[5] F15B *15/06*

U.S. Cl. 74—109 **11 Claims**



1. Actuator, comprising:

a cylinder,

two pistons reciprocally movable in the cylinder,

two racks, each carried by a respective piston,

a pinion coupled to the racks, the racks diametrically opposed to each other relative to the pinion,

an output connecting part coupled to the pinion for connecting a device for driving thereto,

means for communicating a medium under pressure to the pistons for causing the pistons simultaneously to move away from or move towards one another, thereby causing the performing of a corresponding pivoting movement of said output connecting part, and

resetting spring means for forcing said pistons to a terminal rest position,

wherein said resetting spring means comprises at least one gas spring which is connected to each piston, wherein the gas spring is filled partly with gas under pressure and partly with a non-compressible medium, such as oil, so that the piston performs a slowed movement at the end of its stroke directed towards the rest position of the gas spring.

4,955,246

CONTINUOUSLY VARIABLE TRACTION ROLLER TRANSMISSION

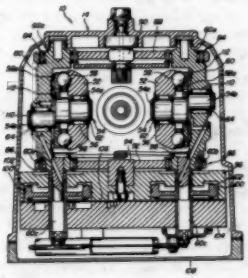
Masaki Nakano, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 26, 1989, Ser. No. 357,192

Claims priority, application Japan, May 27, 1988, 63-69293

Int. Cl.[5] F16H *15/38*; F16C *19/30, 19/48*

U.S. Cl. 74—200 **2 Claims**



1. A continuously variable traction roller transmission comprising:

input and output traction discs having opposite toric surfaces;

two traction rollers arranged in engagement with said toric surfaces of said input and output discs for the transmission of movement therebetween;

two shafts having pivot base portions and pivotal portions eccentric with said pivot base portions;

said traction rollers being rotatably supported on said pivotal portions of said shafts;

two roller support members rotatably supporting thereon said pivot base portions of said shafts and having rotatable shaft portions;

said roller support members being rotatable about and axially slidable on said rotatable shaft portions;

two thrust bearings arranged concentric with said pivotal portions of said shafts and between said traction rollers and said roller support members, respectively;

said thrust bearings having collars on the sides of said roller support members; and

two needle bearings interposed between said collars of said thrust bearings and said roller support members, respectively;

said needle bearings being arranged concentrically with the pivot base portions of said shafts.

4,955,247

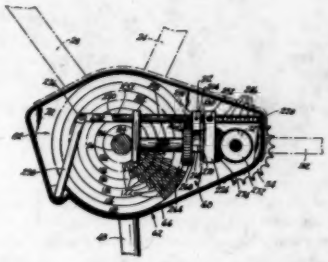
TRANSMISSION

Ernest H. Marshall, 30 Saulters Rd., Manchester, Conn. 06040

Filed Nov. 21, 1988, Ser. No. 273,474

Int. Cl.[5] F16H *3/22*

U.S. Cl. 74—347 **9 Claims**



1. A transmission for transmitting rotary motion from an input shaft to an output location, said transmission comprising an output shaft at the output location, a compound face gear assembly including a back plate having an axis and mountable for rotation with the input shaft, said back plate having radially inner and outer arcuate openings therethrough centered on said axis, radially innermost and outer circumferentially continuous gear rings providing a first gear and a second gear, respectively, said radially outer gear ring surrounding and contiguous with said innermost gear ring, each said gear ring having on one face a plurality of closely spaced radial gear teeth and on an opposite face a lug, all of said gear teeth having a pitch that is the same for all said gear teeth, and said lugs of said innermost and outer gear rings extending through said inner and outer arcuate openings, respectively, each said gear ring being independently rotatable a limited circumferential distance relative to said back plate as determined by the circumferential extent of its said lug as compared to the circumferential extent of its associated arcuate opening, means for transmitting rotation from the input shaft to said gear teeth of a selected one of said gear rings and thence to said output shaft, means for changing the selected one of said gear rings engaged by said means for transmitting rotation, and means for resiliently urging each said lug toward a neutral position spaced from each end of its associated said arcuate opening, wherein said rotation transmitting means includes a sliding pinion having external gear teeth engageable with said gear teeth of any of said gear rings, a spline shaft perpendicular to said output shaft and on which said sliding pinion is slidably mounted, so that said sliding pinion and said spline shaft are rotatable by whatever said gear ring is in engagement with said sliding pinion, and a first bevel gear mounted on an end of said spline shaft and meshing with a second bevel gear which is mounted on said output shaft.

4,955,248

ANGULAR GEAR FOR VENETIAN BLINDS

Vincent Lindstrom, Bankeryd, Sweden, assignor to AB Perma System, Sweden

Filed Feb. 24, 1989, Ser. No. 315,282

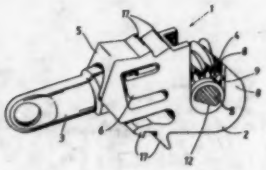
Claims priority, application Sweden, Mar. 1, 1988, 8800720-8

Int. Cl.[5] F16H *1/18*

U.S. Cl. 74—424.5 **3 Claims**

1. An angular gear comprising a gear housing, a helical gear extending from a shaft extending into said gear housing, and a pinion meshing with said helical gear for transmitting turning of said shaft of said helical gear to a turning rod extended through and rotatably fixed to said pinion for rotation of said rod, said shaft being provided with two axially spaced bearing portions of circular cross section and said gear housing having complementary bearing portions, a neck portion being pro-

vided between said two axially spaced bearing portions, said neck portion having a diameter which is less than the diameter of any of said two axially spaced bearing portions, and at least one resilient tongue integral with said gear housing and having



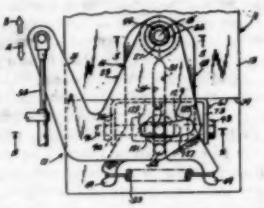
a free end thereof comprising a hook-like means arranged for cooperation with said neck portion, said hook-like means resiliently protruding into said neck portion and locking said shaft in an axial position in said gear housing.

4,955,249

CONTROL MECHANISM FOR HYDROSTATIC TRANSMISSION

Clyde R. Wetor, Cascade, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jun. 26, 1989, Ser. No. 371,268
Int. Cl.[5] G05G *9/12, 5/04*
U.S. Cl. 74—473 R **17 Claims**



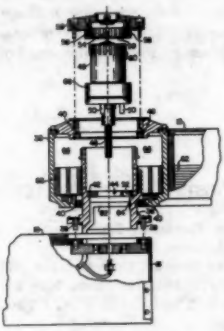
1. A control for a hydrostatic transmission having an operating member rotatable about a fixed pivot axis between a range of forward drive positions, a neutral position, and a range of reverse drive positions, said control comprising an actuating member adapted to be fixed to the operating member for common movement therewith about the pivot axis and having a portion adapted to be connected to an actuating link to effect pivotal movement of said actuating member about the pivot axis, a first return member mounted for pivotal movement about the pivot axis and independently of pivotal movement of said actuating member, a second return member mounted for pivotal movement about the pivot axis and independently of pivotal movement of said actuating member and of said first return member and located in facing relation to said first return member, a pin fixed on said actuating member and extending between said first and second return members, means engaging said return members for biasing said return members toward each other and into engagement with said pin, a neutral adjustment member, and means located in fixed relation to the pivot axis for locating said neutral adjustment member between said first and second return members and for adjustably moving said neutral adjustment member along a fixed path.

4,955,250

MULTIPLE FOREARM ROBOTIC ELBOW CONFIGURATION

John J. Fisher, Wilmington, Del., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 8, 1989, Ser. No. 363,031
Int. Cl.[5] B25J *17/00, 18/00, 9/12*
U.S. Cl. 74—479 **2 Claims**



1. A robotic elbow configuration apparatus comprising:
a main arm having a first side and an opposing side;
an upper forearm rotatably attached for support to said first side of said main arm and adapted to rotate coplanarly with said main arm;
a lower forearm rotatably attached to said opposing side of said main arm and adapted to rotate coplanarly with said main arm and said upper forearm, said lower forearm capable of movement and operating independent of said upper forearm;
a first modular actuator assembly carried by said upper forearm for moving said upper forearm; and
a second modular actuator assembly having the same structure as said first modular actuator assembly carried by said lower forearm for moving said lower forearm;
each of said first and second modular actuator assemblies comprising:
an actuator canister within said modular actuator assembly having
a motor means;
a shaft means turned by said motor means;
a gearing means in operative connection with said shaft means;
a position referencing means in operative connection with said shaft means for determining position;
a spindle within said modular actuator assembly for receiving said actuator canister having a bearing means on which bearing means said actuator assembly rotates; and
an output hub means in operative connection with said gearing means for moving a forearm attached to said actuator assembly.

4,955,251

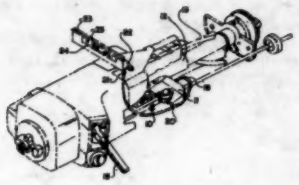
ADJUSTING DEVICE FOR THE POINTER ELEMENT OF A DRIVE RANGE INDICATING DISPLAY

Karl A. Reinert, and Gary W. Alcorn, both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 5, 1989, Ser. No. 446,344
Int. Cl.[5] F16C *1/10*; G01D *5/04*
U.S. Cl. 74—501.5 R **4 Claims**

1. In combination, a device for adjusting the effective length of a control cable having a sheath and core, the control cable being employed to interconnect the pointer element of a vehicle drive range indicator assembly with the drive range select-

ing lever in order to coordinate the designation presented by the indicator assembly with respect to the position of the drive range selecting lever, said device comprising: a frame structure; a block mounted on said frame structure for reciprocating movement; means to secure the control cable sheath to said



block; an operating lever being pivotally mounted on said frame structure; said operating lever being operatively connected to said block such that rotation of said operating lever effects selected reciprocation of said block; and, locking means operatively effective between said operating lever and said frame structure to secure the selected location of said block.

4,955,252

CABLE-AND-SLEEVE CONNECTIONS

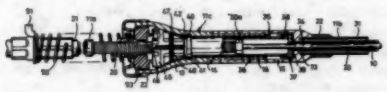
Peter A. G. Clissett, Stourport-on-Severn, and Roger A. Lacey, Shrawley, both of Great Britain, assignors to Acco Cable Controls Limited, Worcestershire, United Kingdom

Filed Aug. 15, 1986, Ser. No. 896,953

Claims priority, application United Kingdom, Aug. 16, 1985, 8520612

Int. Cl.[5] F16C 1/10

U.S. Cl. 74—502.4 5 Claims



1. A cable-and-sleeve connector in which a cable extends through a sleeve the ends of the sleeve lie at positions which are fixed and the sleeve extends in a curved deformable path between its ends, the sleeve comprising a housing and first and second parts that extend one from each end of and are connected together by said housing, said first part being fixed to the housing and said second part being connected at an end portion to the housing by means of a clutch disposed within the housing and operable between a position in which it holds the end portion of said second part fixed relatively to the housing and a position in which said second part is released, the end portion of said second part then being free to reciprocate axially within said housing, resilient means acting on the clutch to urge the clutch into engagement with the sleeve, an actuating member extending around the cable within the housing on the side of the clutch remote from the second part of the sleeve and movable axially between an operative position in which it holds the clutch in the position in which the second part is released and an inoperative position in which it permits the clutch to hold the second part fixed, and a striker fixed to the cable such that, by reciprocation of the cable within the sleeve, the striker can move between a position in which it abuts the actuating member to hold it in its operative position and a position in which it lies withdrawn into the first part of the sleeve and permits the actuating member to move to its inoperative position.

4,955,253

SELF-LOCKING KNOB FOR ADJUSTABLE CONTROL MECHANISM

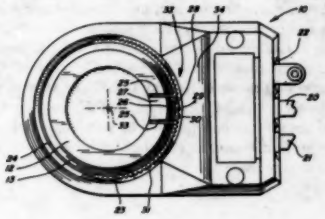
Yoshio Sakai, Ueda, and Takeshi Yamada, Saku, both of Japan, assignors to HTC Co., Ltd and Totoku Electric Co., Ltd., both of, Japan

Continuation of Ser. No. 620,759, Jun. 14, 1984, abandoned. This application Aug. 26, 1986, Ser. No. 902,045

Claims priority, application Japan, Apr. 28, 1984, 59-63648

Int. Cl.[5] G05G 1/10

U.S. Cl. 74—553 7 Claims



1. In a mechanism having an adjustable control, and movable means for adjusting the control, the improvement comprising:

manipulating means connected to said movable means and defining a graspable portion for effecting manual movement of said movable means;

resiliently outwardly biased locking means associated with said graspable portion of the manipulating means for locking said manipulating means against manual movement; and

means responsive solely to grasping of said graspable portion of the manipulating means with sufficient inward grasping force to overcome the biasing of said locking means for concurrently releasing said locking means and permitting movement of said manipulating means to adjust said control, said biasing means comprising means for automatically relocking the manipulating means upon removal of said grasping force with the control retained in the adjusted disposition.

4,955,254

ECCENTRICITY CONTROL DEVICE

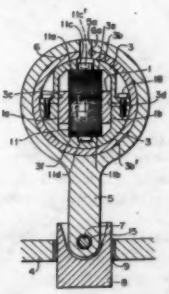
Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Company, Ltd., Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 291,165

Claims priority, application Japan, Dec. 29, 1987, 62-333164

Int. Cl.[5] G05G 1/00; B30B 5/00, 1/06

U.S. Cl. 74—603 1 Claim



1. An eccentricity control device comprising:

a rotary shaft having an eccentric member mounting portion with side surfaces;

a housing including means supporting said rotary shaft on each side of said eccentric member mounting portion;

an eccentric member mounted on said eccentric member mounting portion, said eccentric member having an outer peripheral surface which is at an eccentricity from the axis of said rotary shaft and sliding surfaces which are held in sliding engagement with both side surfaces of said eccentric member mounting portion of said rotary shaft; and

a rotatable screw rod screwed into said eccentric member mounting portion and extending through said eccentric member mounting portion in a direction perpendicular to the axis of said rotary shaft, said screw rod having both ends rotatably supported by said eccentric member such that a rotation of said screw rod causes said eccentric member to move in the axial direction of said screw rod together with said screw rod, thereby causing a change in said amount of eccentricity of said outer peripheral surface of said eccentric member with respect to the axis of said rotary shaft.

4,955,255

POWER TRANSMISSION SYSTEM FOR A MOTOR VEHICLE WITH AN AUTOMATIC TRANSMISSION

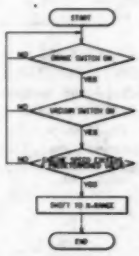
Shunji Yamasshi, and Yoshimitsu Arai, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 282,023

Claims priority, application Japan, Dec. 16, 1987, 62-190968

Int. Cl.[5] B60K *41/04*

U.S. Cl. 74—856 **2 Claims**



1. A power transmission system for a motor vehicle with an automatic transmission operatively connected to an engine comprising:

a brake switch for producing a brake signal when a brake pedal of the vehicle is depressed;

a vacuum switch for producing an acceleration signal when pressure in an intake passage exceeds a predetermined value;

an engine speed sensor for producing an engine speed signal when engine speed exceeds a predetermined speed; and

means responsive to the brake signal, acceleration signal and engine speed signal for cutting off transmission of power of the engine; wherein

said means operates to shift the transmission to a neutral range.

4,955,256

TRANSMISSION CONTROL APPARATUS, HAVING MEANS FOR DETERMINING THE COMPLETION OF A SHIFTING ACTION OF A COUPLING DEVICE WITH PRESSURE ADJUSTING ACCUMULATOR

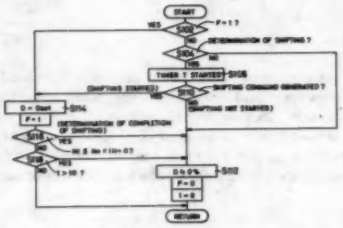
Yuji Kashihara; Kunihiro Iwatsuki, both of Toyota, and Yutaka Taga, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Sep. 8, 1989, Ser. No. 404,903

Claims priority, application Japan, Sep. 22, 1988, 63-238437

Int. Cl.[5] B60K *41/06*

U.S. Cl. 74—866 **6 Claims**



1. A hydraulic control apparatus for controlling a hydraulically operated automatic transmission of a motor vehicle having a frictionally coupling device, an accumulator which communicates with the frictionally coupling device, and a rotary member whose rotating speed changes due to a shifting action of the coupling device, said apparatus including an electronic control device for controlling a back pressure of said accumulator during a shifting action of the frictionally coupling device for minimizing a shifting shock of the transmission, said apparatus comprising:

first determining means for effecting a first determination that the transmission should be shifted with said shifting action of said frictionally coupling device;

means for generating a shifting command to initiate said shifting action after said first determination;

speed detecting means for detecting a rotating speed of said rotary member;

second determining means for effecting a second determination, based on the rotating speed detected by said speed detecting means, that said shifting action of said frictionally coupling device is completed;

time measuring means for measuring a time which has passed after one of a moment when said first determination is effected and a moment of generation of said shifting command; and

third determining means for effecting a third determination that said shifting action is completed, irrespective of the detected rotating speed of said rotary member, when the time measured by said time measuring means exceeds a predetermined time interval.

4,955,257

METHOD OF CONTROLLING SHIFTS IN AN AUTOMATIC TRANSMISSION

Satoshi Terayama, Tokyo; Takashi Aoki; Shigeo Ozawa, both of Saitama, and Eiji Kitsutaka, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 9, 1989, Ser. No. 350,015

Claims priority, application Japan, May 9, 1988, 63-112071

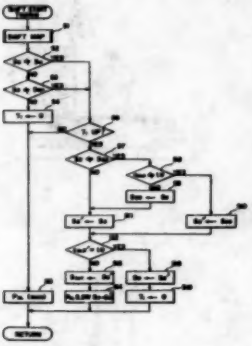
Int. Cl.[5] B60K *41/06*

U.S. Cl. 74—866 **6 Claims**

1. A method of controlling shifts in an automatic transmission having power transmission means comprising a plurality of power transmission paths, and a plurality of shift means for selecting the power transmission paths, said shift means being selectively operable in response to a shift command for switch-

ing said power transmission paths to effect shifts, said method comprising the steps of:

when a first shift command is issued for effecting one of the shifts, detecting the start of operation of the first shift means which selects the first power transmission path determined by said first shift command; and



when a second shift command is issued to select the second power transmission path different from the first power transmission path, after said first shift command is issued but before the start of operation of the first shift means is detected, effecting the shift based on said second shift command.

4,955,258

DEVICE AND METHOD OF FAIL-SAFE CONTROL FOR ELECTRONICALLY CONTROLLED AUTOMATIC TRANSMISSION

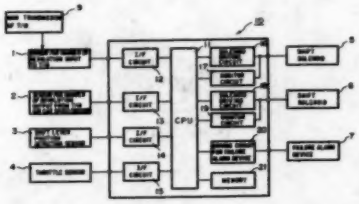
Yasunobu Ito, and Kenji Suzuki, both of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan

Filed Dec. 7, 1988, Ser. No. 280,935

Claims priority, application Japan, Dec. 28, 1987, 62-329507

Int. Cl.[5] B60K *41/06*

U.S. Cl. 74—866 **7 Claims**



1. A fail-safe control device for an electronically controlled automatic transmission including at least one shift solenoid for effecting gear changes and a mechanical portion, said shift solenoid operating responsive to a shift command based on the degree of throttle opening and the speed of the transmission output, said device comprising:

(a) a sensor for detecting the number of revolutions input to said transmission;

(b) a sensor for detecting the number of revolutions output from said transmission or a car speed sensor;

(c) means for calculating an actual gear ratio in accordance with said detected number of input revolutions and said number of detected output revolutions;

(d) means for obtaining a formal gear ratio responsive to shift lever position;

(e) comparison means for determining a failure in the mechanical portion of said transmission by making a comparison between said formal gear ratio and the thus-calculated gear ratio; and

(f) timing means for preventing said determination of failure for a predetermined period of time beginning with a change of the shift solenoid and ending after a new gear stage responsive to said change is stabilized.

4,955,259

LINE PRESSURE CONTROL ARRANGEMENT FOR AUTOMATIC AUTOMOTIVE TRANSMISSION

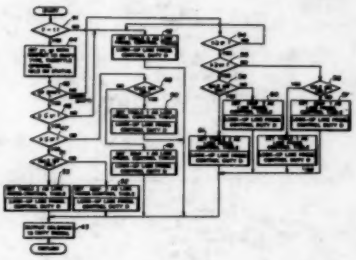
Yasushi Narita, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 14, 1989, Ser. No. 337,869

Claims priority, application Japan, Apr. 15, 1988, 63-91813

Int. Cl.[5] B60K *41/06*

U.S. Cl. 74—866 **11 Claims**



1. In a control system for an automatic transmission of a vehicle, said transmission having an input shaft and an output shaft, said transmission being mounted in a vehicle having an engine, said engine being operatively connected with said input shaft and including means for indicating the load on the engine, said vehicle including means for indicating the vehicle speed, said system comprising:

a line pressure control solenoid;

first and second sets of power on duty cycle control data, said first and second sets of power on duty cycle control data being organized in the form of first and second maps, said first and second maps containing duty cycle values which are each located at different engine load and vehicle speed coordinates;

first and second sets of power off duty cycle control data, said first and second sets of power off duty cycle control data being organized in the form of first and second tables, said first and second tables each defining a duty cycle schedule which is plotted in terms of duty cycle and vehicle speed;

a control circuit for controlling said line pressure control solenoid, said control circuit including a memory in which said first and second sets of power on duty cycle data and said first and second sets of power off duty cycle data, are recorded,

said control circuit including circuit means which is responsive to engine load and vehicle speed for determining a need to induce a shift between gears of said transmission and for conditioning said transmission in a manner which induces said shift to occur, said control circuit being further responsive to said engine load indicating means for:

when said engine load indicating means indicates that a load on the engine exists, selecting said first and second sets of power on duty cycle control data and for sequentially using said first and second sets of power on duty cycle data one after the other to control the operation of said line pressure control solenoid during the time the shift between gears is occurring, and for

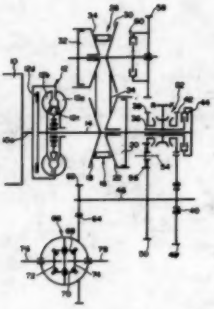
when said engine load indicating means indicates that a load on the engine is absent, selecting said first and second sets of power off duty cycle control data and for sequentially using said first and second sets of power off duty cycle data to control the operation of said line pressure control solenoid during the time the shift between gears is occurring.

4,955,260

HYDRAULIC CONTROL SYSTEM FOR TRANSMISSION

Toshikazu Oshidari, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Mar. 31, 1989, Ser. No. 330,919
Claims priority, application Japan, Mar. 31, 1988, 63-75974
Int. Cl.[5] B60K *41/14*; F16H *11/04*
U.S. Cl. 74—868 **5 Claims**



1. A hydraulic control system for a transmission of the type wherein a gearing mechanism is combined with a V-belt type continuously variable transmission mechanism, the hydraulic control system comprising:

a hydraulic arrangement wherein a hydraulic fluid pressure is supplied to a pulley cylinder chamber which the tension on the V-belt is variable with;

means for increasing the level of said hydraulic fluid pressure in response to a shifting from transmission of torque through the gearing mechanism to the transmission of torque through the V-belt type continuously variable transmission mechanism.

4,955,261

AUTOMATIC CORKSCREW

Yung-Tung Chiang, Chung Ho, Taiwan, assignor to Chyuan How Enterprise Co., Ltd., Taipei Hsien, Taiwan

Filed Mar. 19, 1990, Ser. No. 495,724
Int. Cl.[5] B67B *7/04*
U.S. Cl. 81—3.2 **1 Claim**

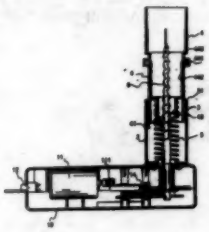
1. An automatic corkscrew comprising:

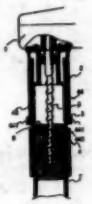
a body having a motor, a power source connected with the motor, a conversion switch electrically connected with the motor, a gear assembly engaged with an output shaft of the motor, a power switch for controlling the power source and a worm fixed connected with an output end of the gear assembly;

a tubular member fixedly engaged at one end with said body;

a ferrule put into the other end of said tubular member with flanges in contact with the edge thereof;

a drawing tube inserted into said ferrule and having collets at the inner end, said collet having a flange in contact with inner edge of said ferrule, and a central cylindrical portion at the inner end, said drawing tube being cut along the length to form resilient plates provided with a protuberance and a plurality of longitudinal projections at the inner sides; and





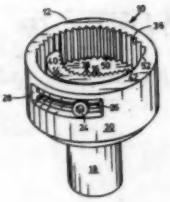
a spring disposed between said tubular member and the central cylindrical portion of said drawing tube.

4,955,262

SOCKET PIPE WRENCH

Kent Womack, Rte. 2, Box 52, Chillicothe, Tex. 79225, and Tony Hise, Box 211, Dumas, Tex. 79029

Continuation-in-part of Ser. No. 323,167, Mar. 15, 1989, Pat. No. 4,920,834, which is a continuation of Ser. No. 98,278, Sep. 18, 1987, abandoned. This application May 9, 1989, Ser. No. 349,574
Int. Cl.[5] B25B *13/16*
U.S. Cl. 81—165 **12 Claims**



1. An apparatus for tightening and loosening a threaded member, comprising:

a socket member having a circular cavity therein defining an inner annular surface for receiving a portion of said threaded member, said inner annular surface having teeth and a cam lobe;

jaw means attached to said socket member and located within said circular cavity, whereby rotation of said socket member causes said jaw means to forcibly impinge upon said portion of said threaded member, said portion of said threaded member being grasped between said jaw means and a part of said teeth of said annular surface, thereby exerting rotational torque on said threaded member; wherein said jaw means includes:

a crescent-shaped member having inner and outer peripheries, said outer periphery having a curvature essentially identical to curvature of said inner annular surface of said cavity, said inner periphery having teeth for grasping said portion of said threaded member, said crescent-shaped threaded member having distal and proximate ends with said distal end being wider than said proximate end, said distal end being adapted to be complementary with said teeth of said inner annular surface, said distal end being separated from said proximate end by an angular distance of an arc of a circle, said arc including a substantial position of said circle;

said cam lobe is a cam wall attached to and integral with said inner annular surface of said circular cavity, said cam wall having a thickness such that said wall has a first position thereof located radially closer to an axis of rotation through said socket member and has a second position thereof located radially further from the axis than said first position, said first position located near said proximate end of said crescent shaped member whereby, as said crescent shaped member slides toward said first position of said cam wall said proximate end of said crescent shaped member is forced toward the center of said circular cavity; and

means for attaching said crescent-shaped member to said socket member.

4,955,263

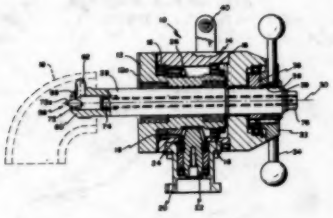
PIPE END PREPARATION TOOL HAVING IMPROVED TORQUE REACTING AND CLAMPING CAPABILITIES

Jerald VanderPol, Eldorado Hills; Mark A. Marshall, Sacramento, and Warren V. Wheeler, Placerville, all of Calif., assignors to Tri Tool Inc., Rancho Cordova, Calif.

Filed Jun. 30, 1989, Ser. No. 373,517

Int. Cl.[5] B23B *3/00, 7/00*

U.S. Cl. 82—118 **14 Claims**



1. A portable lathe comprising:

(a) a mandrel having a longitudinal axis;

(b) means to clamp the mandrel to a pipe adjacent an end of the pipe;

(c) a power unit having a rotating tool portion and a non-rotating portion mounted on the mandrel;

(d) a groove defined by the mandrel, the groove having outwardly diverging opposite sides defining an angle α therebetween;

(e) a torque reacting key having an end portion with converging opposite sides defining an angle therebetween approximately equal to angle α;

(f) means to adjustably mount the torque reacting key in the non-rotating portion of the power unit such that at least a portion of the converging sides of the torque reacting key contact at least a portion of the diverging sides of the groove to react torque forces imposed upon the non-rotating portion of the power unit acting generally perpendicular to the contacting sides and such that the position of the torque reacting key relative to the mandrel may be adjusted to compensate for wear of the contacting sides.

4,955,264

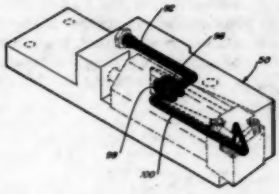
TOOL ASSEMBLY WITH A HYDRAULIC CHIP-BREAKING FLUID SYSTEM

William D. Armbrust, Cary, N.C., assignor to Kennametal Inc., Latrobe, Pa.

Filed May 30, 1989, Ser. No. 358,922

Int. Cl.[5] B23B *27/22*

U.S. Cl. 82—158 **9 Claims**



1. A high-pressure fluid chip breaking tool assembly having a tool holder axially adjustable within a mounting block and the capability of routing high pressure chip breaking fluid through both the mounting block and tool holder, comprising:

(a) a tool block formed with a generally cylindrical tool shank bore extending along a longitudinal axis;

(b) a fluid delivery passage formed in the tool block which extends from an inlet to an outlet;

(c) a tool holder having a head for mounting a cutting insert adapted to engage a workpiece and remove a chip therefrom, and a generally cylindrical tool shank extending rearwardly from the head and adapted to be inserted into the tool shank bore;

(d) a fluid passage formed in the tool holder which extends from an inlet in the shank to a discharge orifice in the head wherein said discharge orifice is positioned to direct a fluid jet at the chip removed from the workpiece to break it into small segments;

(e) an annular recess having front and rear walls formed in the shank of the tool holder and extending circumferentially around the shank, wherein the annular recess defines a fluid path for directing the flow of high-pressure chip breaking fluid from the outlet of the delivery passage formed in the tool block to the inlet of the fluid passage in the tool holder;

(f) adjustment means for adjusting the axial position of the tool holder along the longitudinal axis of the tool block through a selected axial adjustment range; and

(g) wherein the annular recess is so dimensioned to allow axial movement of the tool holder with respect to the tool block throughout the selected axial adjustment range while maintaining fluid communication between the outlet of the delivery passage formed in the tool block and the inlet of the fluid passage in the tool holder.

4,955,265

WEB CUTTING POSITION CONTROL SYSTEM

Hiroshi Nakagawa, Yokohama; Shizuro Tokiwa, Zushi, and Kunio Takeuchi, Yokohama, all of Japan, assignors to Tokyo Kikai Seisakusho Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 97,804, Sep. 16, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 305,281

Claims priority, application Japan, Oct. 10, 1986, 61-242659

Int. Cl.[5] B23Q *15/12*; B26D *5/20*

U.S. Cl. 83—74 **6 Claims**

1. A web cutting position control system comprising: cutting means for cutting a web that is running continuously including a rotating cutting cylinder arrangement;

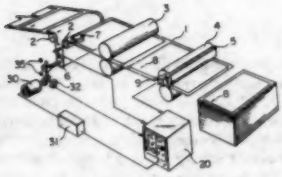
phase detecting means associated with said cutting means for outputting pulses corresponding to the rotational angle of the cutting cylinder arrangement;

a compensating roller operatively engaged with the web and movable between a first position and a second position for changing the path length of the web relative to said cutting means;

movement detecting means for detecting the movement and position of said compensating roller;

synchronizing mark detecting means, installed downstream of said compensating roller for detecting each of a plurality of synchronizing marks provided on said web;

counting means connected to said synchronizing mark detecting means and connected to said phase detecting means for counting the pulse output of said phase detecting means until said synchronizing mark detecting means detects one of said synchronizing marks on said web and outputting a signal representing the number of pulses counted;



reference value memory means for storing in advance a reference value representing a number of pulses output by said phase detecting mean up to the sensing of one of said plurality of synchronizing marks for a predetermined preferred positional relationship between said cutting means and the web;

comparing means for receiving said reference value and said count signal from said counting means and outputting a signal representing the value of the difference between said reference value signal and said count signal; and,

controlling means for receiving said difference signal and for controlling the direction and amount of movement of said compensating roller dependent upon the value of said difference signal.

4,955,266

APPARATUS FOR DETECTING THE DENSITY OR THICKNESS AND VARIATIONS THEREOF OF FIBER MATERIAL AT THE INFEED OF A TEXTILE MACHINE AS WELL AS FOR EVENING THE DENSITY OF THICKNESS VARIATIONS OF FIBER MATERIAL AT THE INFEED OF A TEXTILE MACHINE

Paul Stäheli, Wilen b. Wil; Robert Demuth, Nürensdorf, and Peter Fritzsche, Winterthur, all of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Division of Ser. No. 132,204, Dec. 10, 1987, Pat. No. 4,860,406. This application Oct. 11, 1988, Ser. No. 256,302

Claims priority, application Switzerland, Dec. 12, 1986, 04950868

Int. Cl.[5] D01G *15/36*

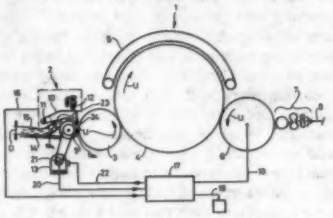
U.S. Cl. 19—105 **28 Claims**

1. An apparatus for determining the instantaneous thickness of fiber material, comprising:

fiber infeed means for infeeding a mass of fiber material and defining a nipping zone;

said nipping zone having a predeterminate substantially constant size which is invariable during determination of the instantaneous thickness of the infed mass of fiber material passing through said nipping zone; and

means cooperating with said fiber infeed means for deriving from passage of the infed mass of fiber material through the nipping zone having said predeterminate substantially constant size, at least one signal representative of the instantaneous thickness of at lease a predeterminate part of



the infed mass of fiber material passing through the nipping zone having said predeterminate substantially size.

4,955,267

METHOD OF MAKING A PTC CONDUCTIVE POLYMER ELECTRICAL DEVICE

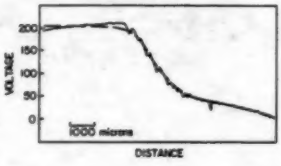
Stephen M. Jacobs, Cupertino; Mary S. McTavish, Fremont, and Frank A. Doljack, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 656,046, Sep. 28, 1984, abandoned, which is a continuation of Ser. No. 364,179, Apr. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 250,491, Apr. 2, 1981, abandoned. This application Jan. 21, 1988, Ser. No. 146,654

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[5] H05B *3/00*

U.S. Cl. 29—611 **19 Claims**



1. A process for the preparation of an electrical device which comprises

(1) melt-extruding a radiation cross-linkable PTC conductive polymer composition to form a laminar PTC element which does not contain an electrode;

(2) cross-linking the conductive polymer by irradiating substantially the whole of the PTC element to a dosage of at least 50 Mrads; and

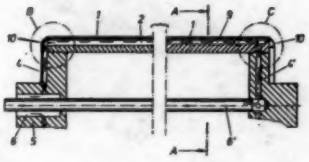
(3) securing metal foil electrodes to the irradiated PTC element.

4,955,268

APPARATUS CONTAINING A WORK SURFACE HEATED WITH A HEAT CARRIER MEDIUM

Georg Eckinger; Willibald Fermüller, both of Graz; Anton Paugger, St. Marein, and Reinhard Pinter, Graz, all of Austria, assignors to Sulzer-Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

Filed Jun. 13, 1988, Ser. No. 205,705
Claims priority, application Austria, Jun. 15, 1987, 1512/87
Int. Cl.[5] B21B 27/00
U.S. Cl. 29—130 79 Claims



1. An apparatus containing a work surface heated by a heat carrier medium, comprising:

a heat-conducting surface layer;

said work surface being located upon said heat-conducting surface layer;

a metallic base body;

said heat-conducting surface layer being carried by said metallic base body and having a surface confronting said metallic base body;

said metallic base body having a surface confronting said heat-conducting surface layer;

said surface of said heat-conducting surface layer and said surface of said metallic base body defining two mutually confronting surfaces;

at least one of said two mutually confronting surfaces being provided with a plurality of lengthwise grooves extending lengthwise of the associated one of the two mutually confronting surfaces;

each one of said lengthwise grooves having an inlet region for infeeding said heat carrier medium;

said at least one surface further containing heat transfer reducing means in the region of said inlet region of said lengthwise grooves for reducing heat transfer in said inlet region of said lengthwise grooves;

said heat carrier medium heating said work surface by throughflow of said heat carrier medium through said plurality of lengthwise grooves; and

said plurality of lengthwise grooves and said heat damming means constituting control means for regulating heat conduction from said metallic base body to said heat-conducting surface layer and from said heat carrier medium guided in said plurality of lengthwise grooves to at least one of said two confronting surfaces.

4,955,269

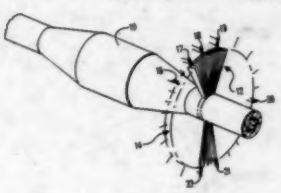
TURBINE BLADE FATIGUE MONITOR

Robert P. Kendig, Monroeville; Roger A. Lucheta, Murrysville, and Francis S. McKendree, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 152,266, Feb. 4, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 333,718
Int. Cl.[5] G01M 3/00
U.S. Cl. 73—577 12 Claims

1. A vibratory fatique measuring apparatus for measuring fatique in equipment including a turbine rotor having a plurality of turbine blades, comprising:

sensor means for generating a displacement signal indicating displacement of the turbine blades caused by vibration generated during normal operation of the equipment, said sensor means including at least two sensors positioned outside a path taken by the turbine blades; and



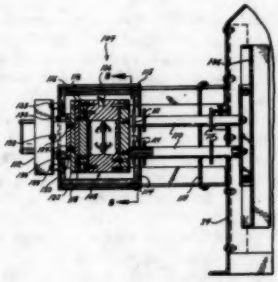
fatique accumulation means for calculating fatique usage in the turbine rotor in dependence upon the displacement signal.

4,955,270

DRY FLOW SENSOR

Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven Inc., Earth City, Mo.

Continuation of Ser. No. 98,799, Sep. 21, 1987, abandoned. This application May 30, 1989, Ser. No. 361,795
Int. Cl.[5] G01F 1/30
U.S. Cl. 73—861.71 32 Claims



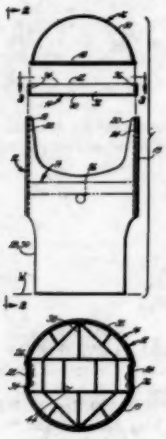
1. A device for measuring the flow rate of a stream of granular material comprising a force transducer, a surface, means to mount said surface directly from said force transducer in a cantilever fashion for generally horizontal movement, said surface mounting means having no generally vertical bearing surfaces so that as the stream impacts the surface substantially all of the horizontal component of the force from said impacting stream is transmitted to the force transducer, said force transducer including a movable member, said surface mounting means comprising a pair of rods extending between the movable member and the surface, each rod being secured to the movable member at one end and the surface at the other end, a tubular member surrounding each rod, said tubular members being held in place by compression between the surface and the movable member, and means to mount said force transducer from a support wherein said surface is deflected by the stream of granular material to thereby produce an output of the force transducer corresponding to the flow rate of the granular material.

4,955,271

LETTUCE AND VEGETABLE CUTTING DEVICE

Paige L. Z. Boutin-Lester, 8205 62nd Street Ct. East #1602, Sarasota, Fla. 34243

Filed Oct. 31, 1989, Ser. No. 429,698
Int. Cl.[5] B26D 3/26
U.S. Cl. 83—404.3 8 Claims



1. A lettuce and vegetable cutting device comprising:

an upright generally cylindrical, very thin-walled tubular frame supportable atop a horizontal working surface, said frame having opposing upwardly extending support portions;

a cutting grid formed as a single member positioned horizontally at a mid point within said frame above the working surface for supportively receiving the head of lettuce, said grid having a plurality of connected cutting blades each having upwardly facing cutting edges which collectively define a first plane;

said cutting blades arranged within said grid to define a plurality of non-uniform apertures;

said support portions structured having opposing openings downwardly extending from the upper margin of said frame to laterally support and contain the head of lettuce therebetween and spaced for easy hand clearance and access to the head of lettuce atop said cutting grid;

a separate ram having a handle connected to a horizontal plate with a lower surface, said plate sized to slidably fit within said frame and to mate atop said cutting grid wherein said lower surface is against said cutting edges;

said rim manually forcing the head of lettuce downwardly through said apertures whereby the head of lettuce is sectioned into a plurality of non-uniform elongated segments;

said plate lower surface including a recess grid which collectively defines a second plane and formed of a plurality of grooves having a shallow depth in relation to the height of said cutting blades in alignment and registry with said cutting edges wherein said cutting edges are positioned within said grooves when said lower surface is atop and against said cutting edges;

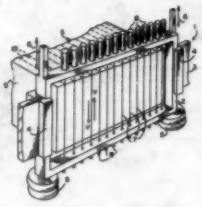
said apertures in plan view being rectangular, triangular and polygonal in shape.

4,955,272

DEVICE FOR CUTTING GAS CONCRETE

Willem J. Schreuders, Staphorst, Netherlands, assignor to Durox Gasbeton B.V., Netherlands

Filed Jan. 28, 1988, Ser. No. 149,677
Claims priority, application Netherlands, Feb. 4, 1987, 8700271
Int. Cl.[5] B28B 11/14
U.S. Cl. 83—425.2 14 Claims



1. Apparatus for cutting material such as gas concrete and like plastic material at a velocity S which is greater than 4.5 meters per minute, which comprises the combination of a vertically extending cutter structure presenting an opening through which the material being cut may be passed, means for passing the material to be cut through the opening at a material carrying velocity S, a plurality of cutting wires stretched across the opening in the path of material to be cut, and means for reciprocating the wires independently from one another to impart an average velocity V to the cutting wires which is at least six times the velocity S, wherein the cutter structure comprises a pair of frames, each reciprocally guiding a plurality of wire end holders in which opposite ends of the cutting wires are held, the means for reciprocating the wires simultaneously driving the wire end holders so that each wire reciprocates relative to said pair of frames.

4,955,273

ONE PIECE INSERTED SAW TOOTH

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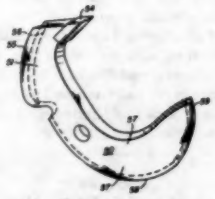
Filed Jun. 2, 1989, Ser. No. 360,600
Int. Cl.[5] B23D 59/00
U.S. Cl. 83—845 12 Claims



1. A one piece saw tooth insert for use in combination with a circular saw blade of the circular inserted bit type having a plurality of circumferentially spaced sockets formed in the outer periphery, said sockets having a first generally circular edge surface of a first given radius and a first given center of radius and adapted to receive a saw tooth bit insert, and having a second generally circular edge surface of a second given radius and a second given center of radius and adapted to receive a shank insert such that said shank will hold and lock said bit in place, the length of the first given radius being different from the length of the second given radius; said one piece saw tooth insert comprising a bit portion with a cutting

edge thereon and a shank portion, said shank portion having a generally circular outer edge surface with a radius and a center of radius substantially equal to said second given radius and said second given center of radius respectively and adapted to be rotated into and received by said second generally circular edge surface of said socket without substantial deformation of said shank portion, said bit portion having a generally circular outer edge surface with a radius substantially equal to said first given radius but having a center of radius sufficiently off-set from said first given center of radius such that said generally circular outer edge surface of said bit potion is tipped with respect to the first generally circular edge surface of said socket so that the bit portion can be rotated into and received by said first generally circular edge surface of said socket with said bit portion being elastically bent to fit within said first generally circular edge surface of said socket with the cutting edge pivoted against the cutting direction, so that said bit portion is tightly biased against said first generally circular edge surface of said socket, to thereby lock said one piece insert into said socket.

4,955,274

VIOLINS

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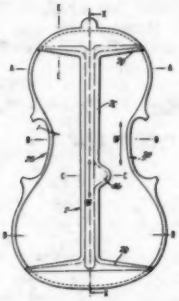
Filed Oct. 26, 1988, Ser. No. 263,028
Int. Cl.[5] G10D *1/02*
U.S. Cl. 84—275 **11 Claims**



1. A violin manufactured by fabricating an acoustic box from components comprising a front plate, a back plate, and side pieces, joining the front plate to the back plate, and, mounting within the acoustic box, a bass bar, characterized in that all of these components are fabricated from sheet material composed essentially of substantially unidirectionally oriented man-made fibers set in a matrix of resin, the alignment of the fibers being substantially parallel to the central, longitudinal axis of the acoustic box.

4,955,275

ADJUSTABLE TREMOLO TAIL PIECE

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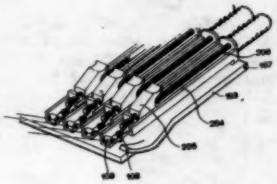
Filed Jan. 25, 1988, Ser. No. 147,486
Claims priority, application Japan, Sep. 17, 1986, 61-141470
Int. Cl.[5] G10D *3/00*
U.S. Cl. 84—313 **16 Claims**

1. A string mounting member pivotably mounted on a stringed instrument comprising,

a first member pivotably mounted with respect to the main body of said instrument for pivoting relative to a bridge saddle mounted on said body over which a string of said instrument passes; and

a plurality of tuners provided on said first member for adjusting the tension of the strings of said instrument wherein at least one of said tuners comprises a section having a lower surface by which a string path of a string of said instrument is defined, the position of which section relative to the pivoting axis of said first member being



adjustable independantly of that of the other tuners of said instrument, and wherein actuation of said tuner for adjusting the tension of said string does not affect the positional relationship between said section and said pivoting axis.

4,955,276

DANCE PERCUSSION PLATFORM

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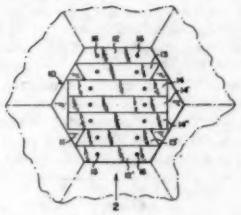
Filed Jun. 23, 1989, Ser. No. 370,602
Int. Cl.[5] G10D *13/08*
U.S. Cl. 84—403 **10 Claims**



1. A tap dance platform, to be placed on the ground or a floor surface, for producing pitched sounds in response to energy imparted onto a surface of the platform comprising:

a planar flat base surface supported by the ground or floor surface;

parallel, spaced-apart supports mounted on said base surface and having resilient insulating strips disposed on their top surface;

sidewalls joined to the periphery of said base surface to form a partially closed container thereof, said sidewalls including apertures therethrough for permitting sound to escape from within the platform;

a plurality of flat, elongated spaced apart keys demountably secured to the strips of said supports, which contact the entire width of each key for the purpose of stability, to define a sound chamber between the base and a bottom of the keys, said supports being spaced aparat to engage each key at its two nodal points of a fundamental vibrational mode; and

a top surface mounted on said side walls and partially surrounding the ends of said keys, said top surface being level with a surface of said keys, said keys, said top and sidewalls, and said flat base surface defining a resonant sound chamber within and forming a substantially flat dance platform suitable for precise placement of feet without limitation over entire surface of instrument;

said keys being closely spaced apart to define a small air gap

between the individual keys, themselves, and the top surface of the platform, said air gap being just sufficiently wide enough so that the keys are free to vibrate independent of one another, and independent of the top surface.

4,955,277

DRUM PEDAL

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Continuation-in-part of Ser. No. 148,034, Jan. 25, 1988, Pat. No. 4,890,532. This application Sep. 28, 1989, Ser. No. 414,179

Int. Cl.[5] G10D *13/02*

U.S. Cl. 84—422.1 **9 Claims**

1. A drum pedal having a foot pedal pivotally mounted to a base, a mallet head and handle attached to a crossarm mounted for rotation about an axis within a pair of bearings supported upon a pair of uprights arising from said base, such that a toe end of said foot pedal lies generally between said uprights and below said crossarm, and a flexible member connected at one end to a curved lever attached to said crossarm, said drum pedal comprising;

a wheel mounted in said toe end for rotation about an axis substantially parallel to the axis of said crossarm;

wherein said flexible member is further wrapped from said curved lever, under said wheel, and then upwardly for attachment to a mounting point connected to said base.

4,955,278

OPTIMIZATION OF WAVEFORM OPERATION IN ELECTRONIC MUSICAL INSTRUMENT

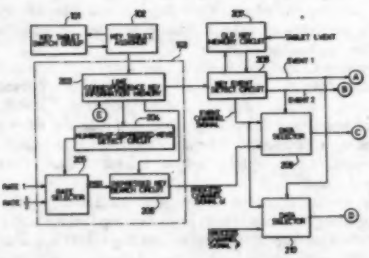
Kiyomi Takauji, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Japan

Continuation of Ser. No. 92,220, Sep. 2, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 311,235

Claims priority, application Japan, Sep. 19, 1986, 61-221647

Int. Cl.[5] G10H *1/18, 7/04*

U.S. Cl. 84—605 **5 Claims**



4. An electronic musical instrument comprising:

a plurality of keys;

tone generator means, associated with said plurality of keys, for generating a plurality of synthesized waveforms determined by the combination and number of said plurality of keys being depressed;

a plurality of note memories capable of storing said plurlaity of synthesized waveforms;

operation cycle means, associated with said plurlaity of note memories, for sequentially addressing each of said plurality of note memories over a period of time;

detector means, associated with said plurality of keys, for detecting the number of said plurality of keys being depressed;

rate selector means, associated with said operation cycle means and said detector means, for reducing said period of time when said number of said plurality of keys being depressed is reduced; and

generator means, associated with said plurality of note memories, for producing a sound;

whereby when heard the feeling of discontinuity in the temporal variation of the resulting musical waveform is reduced.

4,955,279

APPARATUS FOR SETTING A PROJECTILE TIME FUZE

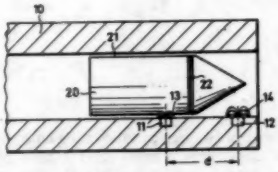
Klaus H. Nahrwold, Hermannsburg, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 8, 1989, Ser. No. 404,524

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830518

Int. Cl.[5] F42C *17/00*

U.S. Cl. 89—6.5 **14 Claims**



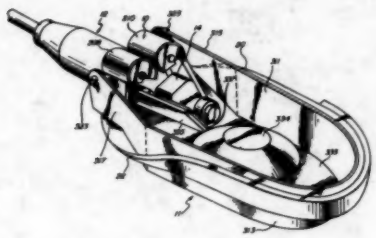
1. Apparatus for setting a time fuze in a projectile after firing from a gun barrel comprising: first and second magnetic field generators disposed in said gun barrel adjacent its muzzle and at a known axial distance from one another; magnetic field sensor means, mounted on the projectile, for sensing the respective magnetic fields generated by said first and second magnetic field generators as the projectile passes same after firing and for producing respective first and second output pulses; and circuit means, disposed in said projectile and responsive to said first and second output pulses, for correcting the fuze time setting in accordance with the muzzle velocity of the projectile; and wherein said circuit means includes a source of clock pulses, a start/stop counter means, connected to said magnetic field sensor means via an amplifier, for beginning counting of clock pulses from said clock pulse source upon receipt of said first output pulse and for stopping counting of said clock pulses upon receipt of said second output pulse to provide a final count which is a measure of the muzzle velocity of the projectile, and further circuit means, responsive to the final count in said start/stop counter means, for correcting the time fuze setting.

4,955,280

AMMUNITION TRANSFER APPARATUS

William C. Baldwin, Costa Mesa, Calif., assignor to North American Dynamics, Tustin, Calif.

Filed Sep. 6, 1989, Ser. No. 403,619
Int. Cl.[5] F41A 9/31, 9/37
U.S. Cl. 89—33.04 17 Claims



1. Automatic weapon apparatus comprising:

an M242 gun having a dual feed apparatus, including first and second ammunition feed sprockets having respective receptacles for receiving rounds of ammunition;

turret means for mounting said gun with said dual feed apparatus rotated substantially vertical, said turret means including first and second sides and first and second mounting arms extending from said first and second sides, respectively;

dual ammunition feed means synchronized with said dual feed apparatus for receiving first and second supplies of linked rounds fed generally upwardly on either side of said gun, respectively, and for rotating said rounds substantially 180 degrees to enter the vertical dual feed apparatus from either side of said gun and for guiding each round into a respective receptacle, thereby positively controlling feeding of ammunition into said dual feed apparatus; and

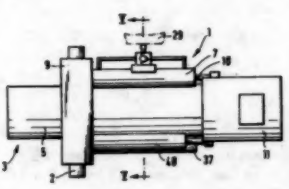
first and second flex chutes connected to said ammunition feed means for supplying said linked rounds, each said flex chute being wrapped around a respective said side of said turret means and extending upwardly within one of said arms to connect to said ammunition feed means.

4,955,281

COUNTERRECOIL BLOCKING DEVICE

Josef Metz, Neuss, and Hans Hülsewis, Ratingen, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,393
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826652
Int. Cl.[5] F41A 25/02
U.S. Cl. 89—43.01 8 Claims



1. In a gun including a barrel arranged to execute a recoil and a counterrecoil after a shot is fired; a trunnion about which the barrel is pivotal in a vertical plane to assume an index position and firing positions situated at an angle to the index position; a case ejector for ejecting a case from the barrel during counterrecoil; the improvement comprising a counterrecoil blocking means for interrupting the counterrecoil as long as the barrel is in a firing position other than said index position and for allowing the counterrecoil to resume when the barrel assumes the index position, whereby case ejection by the case ejector is effected in the index position; said counterrecoil blocking means comprising

(a) a stationary cylinder containing hydraulic fluid;

(b) a piston rod received in said cylinder and being secured at least indirectly to said barrel to move therewith as a unit during recoil and counterrecoil;

(c) a piston axially slidably received in said cylinder and being secured to said piston rod for axial movement therewith as a unit; said piston dividing said cylinder into adjacent first and second cylinder chambers; said piston having an opening for effecting hydraulic communication between said first and second cylinder chambers;

(d) a first valve means mounted on said piston and having a first position blocking said opening for preventing hydraulic communication between said first and second cylinder chambers; said first valve means having a second position unblocking said opening for allowing hydraulic communication between said first and second cylinder chambers;

(e) means for placing said first valve means into said second position during said recoil for allowing hydraulic fluid to pass from one of the cylinder chambers into the other, whereby recoil is permitted to proceed;

(f) means for placing said first valve means into said first position during said counterrecoil for preventing hydraulic fluid from passing between the cylinder chambers, whereby counterrecoil is interrupted;

(g) a bypass conduit connecting said first and second cylinder chambers with one another;

(h) a second valve means arranged in said bypass conduit and having closed and open positions for respectively blocking and unblocking said bypass conduit during counterrecoil; and

(i) valve actuating means cooperating with said second valve means for placing said second valve means from the closed position into the open position when the barrel assumes said index position for allowing hydraulic liquid to pass from one of the cylinder chambers to the other through said bypass conduit, whereby counterrecoil is allowed to resume in the index position.

4,955,282

UNIFORM FLOW HYDRAULIC SYSTEM

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Filed Mar. 27, 1989, Ser. No. 328,876
Int. Cl.[5] F15B 11/08, 13/04
U.S. Cl. 91—436 6 Claims

1. A hydraulic compression system comprising:

(a) a blind end head affixed to a stationary inner rod tube and a stationary outer rod tube, said inner and outer rod tubes being concentric and spaced apart and said blind end head having an axial port communicating with the interior of said inner rod tube and a radial port communicating with a first annular region between said inner and outer rod tubes;

(b) a hollow piston rod mounted for linear reciprocal motion within said first annular region and extending therefrom;

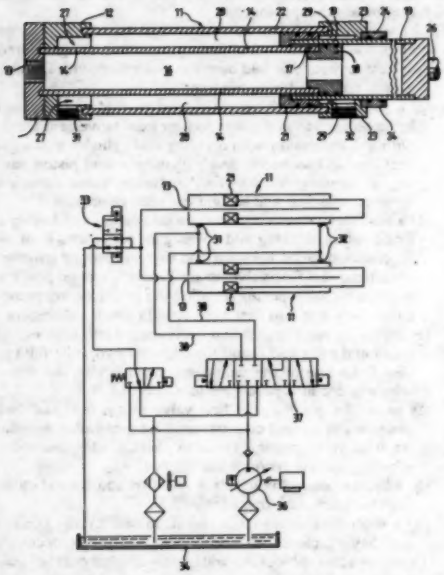
(c) a piston carried on the inner end of said hollow piston rod in sliding sealed engagement with the inner surface of said outer rod tube such that an annular return chamber is formed between said piston rod and said outer rod tube;

(d) an annular seal carried by said inner rod tube providing a sliding seal between said inner rod tube and the inside of said piston rod such that an annular travel chamber is formed between said inner rod tube and said outer rod tube;

(e) a rod end head having an axial bore through which said

piston rod may retract and extend while maintaining a sliding seal therewith, said rod end head having a radial port communicating with said travel chamber between said hollow piston rod and said outer rod tube; and

(f) a hydraulic system including a reservoir, at ambient pressure, a single pump having a pressurized output, and valve means for selectively applying high pressure fluid



only in said travel chamber while aspirating fluid from said reservoir through said axial port in an extension mode, applying high pressure fluid to said travel chamber and said axial port in a compression mode, and applying high pressure fluid only to said return chamber in a retraction made whereby the flow rate from said pump remains approximately uniform for each mode.

4,955,283

HYDRAULIC CIRCUIT FOR CYLINDER

Sachio Hidaka, Kakogawa; Hiroshi Shibata, Kobe, and Hideaki Yoshimatu, Akashi, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

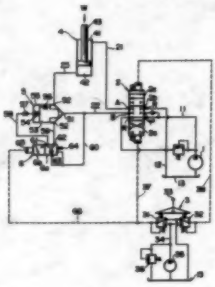
Filed Feb. 27, 1989, Ser. No. 316,131
Claims priority, application Japan, Mar. 3, 1988, 63-28563[U]
Int. Cl.[5] F15B *11/08*
U.S. Cl. 91—447 **4 Claims**

1. A hydraulic circuit for a cylinder in a hydraulic power transmission for controlling pressurized oil flow to and from two oil chambers including a load holding oil chamber and a load lowering oil chamber in the cylinder, comprising:

a directional control valve in communication with a pressurized oil source and connected between said pressurized oil source and said two oil chambers

a logic valve connected between said directional control valve and said load-holding oil chamber in said cylinder, said logic valve having first and second ports connected to said directional control valve and to said load-holding oil chamber, respectively;

a selector valve having means for communicating a spring chamber of said logic valve with a conduit between said first port and said directional control valve when said directional control valve is switched to a position wherein pressurized oil is supplied to said load lowering chamber of said cylinder and having means for communicating said spring chamber with said second port in at least one other operational phase, including a pilot operating valve wherein said selector valve and said directional control valve comprise pilot change-over valves switchable by



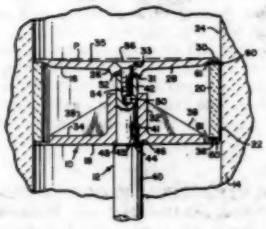
pilot pressure from a pilot operating valve, wherein the pilot pressure sufficient for switching said selector valve is preset at a level lower than the pilot pressure sufficient for switching said directional control valve.

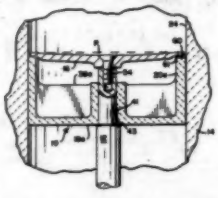
4,955,284

PISTON HAVING CERAMIC PARTS

Henry B. Faulkner, Dover, Mass., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Feb. 27, 1989, Ser. No. 315,977
Int. Cl.[5] F16J *9/00*
U.S. Cl. 92—248 **12 Claims**





1. A piston having ceramic parts, comprising:

a first endwall, said first endwall being free of ribs and of a first stiffness;

a second endwall, said second endwall having a hub and being reinforced by ribs extending radially outwardly from the hub, said second endwall being of a second stiffness greater than the first stiffness;

means for limiting rotation of the hub relative to an associated piston rod;

a tubular sidewall extending between and forming a closed cylinder with the first and second endwalls, the sidewall being of ceramic material, the piston being free of a piston ring and at least the first endwall is of metal; and

means for limiting rotation of the endwalls relative to the sidewall.

4,955,285

SYSTEM FOR COVERING THE ENERGY REQUIREMENT OF A ROOM

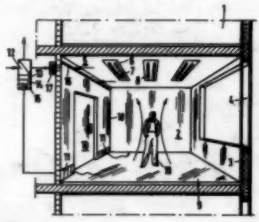
Peter Geilinger, Winterthur, and Bruno Keller, Zurich, both of Switzerland, assignors to Geilinger AG, Wiesendangen, Switzerland

Continuation of Ser. No. 878,373, Jun. 4, 1986, abandoned. This application Sep. 23, 1988, Ser. No. 250,964

Claims priority, application European Pat. Off., Oct. 8, 1984, 84810486.5

Int. Cl.[5] F24F *3/02*

U.S. Cl. 98—39.1 **10 Claims**



1. The combination of

a building having at least one room with a floor and an outside wall including a window having a heat transfer number of at most 1 W/m^2 K and an opaque wall part having a heat transfer number of at most 1 W/m^2 K; and

a ventilating system for feeding air into said room over a width of at least one wall of said room and adjacent said floor, said ventilating system including a blower for blowing the air into said room at a velocity below a predetermined comfort velocity for an occupant in said room.

4,955,286

TURBULENCE OUTLET

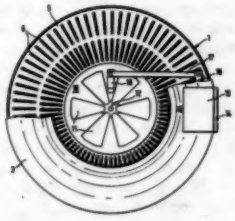
Gottfried Müller, and Paul Hipp, both of Kolbingen, Fed. Rep. of Germany, assignors to Schako Metallwarenfabrik Ferdinand Schad AG, Kobingen, Fed. Rep. of Germany

Filed Jun. 12, 1989, Ser. No. 364,176

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 3822283

Int. Cl.[5] F24F *13/068*

U.S. Cl. 98—40.11 **9 Claims**



1. Turbulence outlet to be connected to a pipe connection of an air conduit having a turbulence plate which has a plurality of slots formed with inclined lamellae on an edge of the slots wherein the turbulence plate exhibits somewhat centrally at least one aperture and closable means being associated with said one aperture.

4,955,287

SELF-VENTILATED GREENHOUSE

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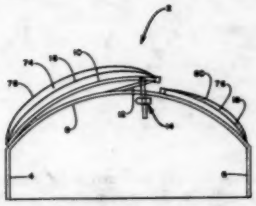
Continuation-in-part of Ser. No. 184,360, Apr. 21, 1988, Pat. No. 4,815,365. This application Mar. 22, 1989, Ser. No. 327,320

The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.[5] F24F *7/02*

U.S. Cl. 98—42.2 **9 Claims**



1. A self-ventilated greenhouse, comprising:

(a) a frame including first and second parallel rows of rigid, elongated, vertical members; a first set or elongated frame members, a first end of each frame member of the first set secured to the upper end of one of the members comprising the first row of vertical members, the second end of each frame member of the first set secured to the upper end of one of the members comprising the second row of vertical members; a second set of elongated frame members disposed above the first set of frame members, shorter than the first set of frame members, and partially overlapping the first set of frame members, a first end of each frame member of the second set secured to the upper end of one of the members comprising the first row of vertical members; a plurality of cross-members hingedly connecting the second end of each frame member of the second set to a frame member of the first set, at a point lying between the ends of the frame member of the second set, to guide the frame members of the second set as they are separated from and reunited with the frame members of the first set to provide intermittent ventilation for the greenhouse; and means for separating and reuniting the first and second sets of frame members;

(b) a first translucent sheet disposed above and supported by the second set of elongated frame members; and

(c) a second translucent sheet disposed above and supported by that portion of each of the frame members of the second set extending from the upper end of the second vertical member to the junction of the frame member of the second set with the cross-member, the first and second translucent sheets thereby forming a self-ventilated roof for the greenhouse.

4,955,288

CAKE MANUFACTURING MACHINE

Tsai-An Chen, 201, Sec.3, BA-DAR Road, Taipei, Taiwan

Filed Aug. 23, 1988, Ser. No. 235,275

Int. Cl.[5] A47J *37/00, 44/00*

U.S. Cl. 99—348 **9 Claims**

1. A cake manufacturing machine for partially baking cakes prior to insert of said partially baked cakes into a baking oven, comprising:

(a) a main frame;

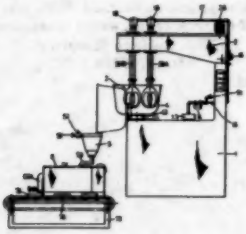
(b) a support frame rotatably secured to said main frame;

(c) churning means for agitating ingredients contained therein, said churning means including a churning vessel

rotatably coupled to said main frame for tilting said churning vessel through a predetermined angle to allow flow of agitated ingredients into a funnel member by gravity assist;

(d) a heating device defined by a box heated by hot air for partially baking said agitated ingredients, and heating device in aligned communication with said funnel member;

(e) means for extruding said partially baked ingredients from



said heating device, said extruding means including an extrusion cylinder for transporting said partially baked ingredients through said heating device; and,

(f) conveying means located below said extrusion cylinder for containing and transporting cake plate members into alignment with said extrusion cylinder for extruding said partially baked ingredients into said cake plate member for transport into said baking oven.

4,955,289

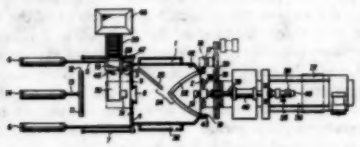
TEA LEAVES FIRING EQUIPMENT

Shohei Eguchi, Kho 4397-banchi, Ouzu-Shimojuku, Ureshino-machi, Fujitsu-gun, Saga-ken 843-03, Japan

Filed Mar. 20, 1989, Ser. No. 325,702

Int. Cl.[5] A23F *3/16*

U.S. Cl. 99—483 **8 Claims**



1. An apparatus for processing raw tea leaves comprising a cylindrical chamber means for firing raw tea leaves, said chamber means having an open side, a second side opposite said open side having a netted surface, and a tea leaves collecting plate means arranged in said chamber means for discharging fired tea leaves from said chamber means through said open side; control means for rotating said chamber means in a first direction and in a second direction opposite to said first direction; heating means arranged about said chamber means for heating raw tea leaves in said chamber means; round disk means having a netted surface and means defining a central opening in said netted surface; first hydraulic means for moving said round disk means horizontally into and out of engagement with said open side of said chamber means; first air-tight cover means adapted to engage said round disk means to cover said open side of said chamber means when said round disk means is engaged with said open side; second hydraulic means for moving said first air-tight cover horizontally into and out of engagement with said round disk means; second air-tight cover means adapted to engage said netted surface of said second side of said chamber means to cover said second side; third hydraulic means for moving said second air-tight cover horizontally into and out of engagement with said netted surface of said second side of said chamber means; and transfer means for supplying raw tea leaves to said chamber means through said central opening in said round disk means, said transfer means comprising port means adapted to engage said central opening in said netted surface of said round disk means and retractable chute means connected to said port means, arranged above said first air-tight cover and said round disk means and adapted to move said port means down and into engagement with said central opening of said round disk means when said round disk means is engaged with said open side of said chamber means and said first air-tight cover is not engaged with said round disk means.

4,955,290

ELECTRONIC MULTIMACHINE OPERATING SYSTEM FOR REMOTELY CONTROLLING PRINTING MACHINES

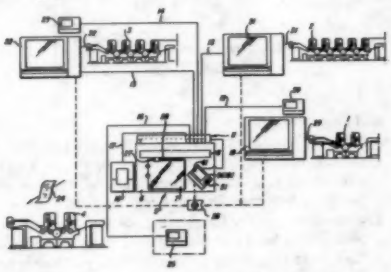
Helmut Kipphan, Schwetzingen, and Gerhard Loffler, Walldorf, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 902,526, Sep. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 705,369, Feb. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 500,776, Jun. 3, 1983, abandoned. This application Jul. 11, 1988, Ser. No. 217,541

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1982, 3220803

Int. Cl.[5] B41F *5/06, 33/16*

U.S. Cl. 101—183 **8 Claims**



1. A combination comprising a plurality of printing machines and an operation system for operating said plurality of printing machines, at least one of said machines having machine characteristics that are different from the machine characteristics of the remaining machines, said operating system including a central ink density measuring installation for measuring ink density data of a printed product; at least one viewing screen terminal associated with each respective one of said machines for showing said ink density data, at least one control desk coupled with each respective one of said printing machines, electrical coupling means for electrically coupling said ink density data from said measuring installation to said viewing screen terminal; and visual coupling means for visually coupling said ink density data from said viewing screen terminal to each said printing machine; assignment means for assigning a printed product to a respective one of said printing machines, said assignment means including at least one identification field on the printed product, and measuring means included in said central ink density measuring installation for measuring said identification field for automatically identifying said identification field; including a printing control strip printed on said printed product, said printing control strip including said at least one identification field measurable by said central ink density measuring installation; computing means and means responsive to said computing means for performing a positioning and a recognition procedure on said central ink density measuring installation for declaring said identification field as identifying an assignment of said printed product to said respective one of said printing machines; said

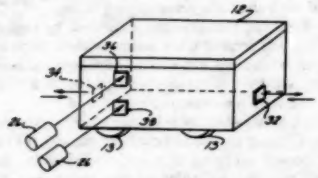
electrical coupling means including a multi-data-channel transmitter, an output of said ink density measuring installation being connected to said multi-data-channel transmitter for transmitting said ink density data to said viewing screen terminals from said ink density measuring installation; and means for selectively assigning a channel of said multi-data-channel transmitter to each respective one of said printing machines.

4,955,291

CONVEYOR WITH SELF PROPELLED VEHICLES EACH HAVING AN ON BOARD CONTROL

David M. Dillon, Grand Ledge; Michael R. Boyer, and James F. Foster, both of Lansing, all of Mich., assignors to Roberts Sinto, Lansing, Mich.

Filed Jul. 14, 1988, Ser. No. 219,014
Int. Cl.[5] B61L *23/24*
U.S. Cl. 104—299 7 Claims



1. A conveyor (10) of the type including a plurality of vehicles (12) propelled around a track (14), each of said vehicles (12) being driven by a D.C. motor (54) and an on-board battery (52), said vehicles (12) having means for sensing the approach to a next ahead vehicle (32, 34) and on-board control means (40) for stopping said vehicle (12) to queue said vehicle (12) therebehind, the improvement comprising; photosensor means (32,34) located at the forward end of each of said vehicles (12), triggered only upon the approach to a next ahead vehicle (12) at a distance on the order of several inches, to generate a signal in response to said approach to said next ahead vehicle and triggering of said photosensor means; and, an on-board control (40) responsive to said signal generated upon triggering of said photosensor means to progressively reduce the power to said D.C. motor (54) to zero and thereby gradually decelerate said vehicle (12) to a stop immediately behind said next ahead vehicle.

4,955,292

DUAL-MODE RAIL-HIGHWAY SEMI-TRAILER WITH SEPARABLE BOGIE

Christopher A. Cripe, Coatesville, Pa., assignor to The Chamberlain Group, Inc., Elmhurst, Ill.

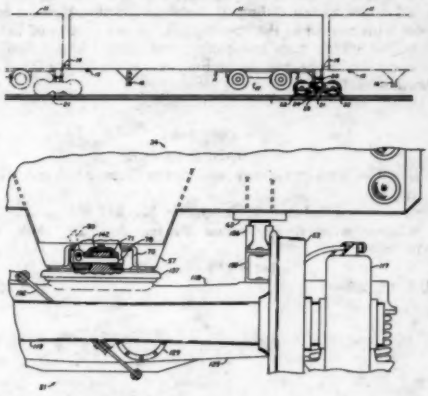
Filed Nov. 18, 1983, Ser. No. 553,042
Int. Cl.[5] B61F *3/12, 5/16;* B61G *1/28*
U.S. Cl. 105—4.2 22 Claims

1. A dual-mode rail-highway semi-trailer comprising:

a semi-trailer body, a highway wheel-set axle unit, air spring means supporting said body on said highway wheel-set axle unit, means to selectively raise said highway wheel-set axle unit to an inoperative position and to lower the same into a ground-engaging operative position for over-the-road highway travel;

the semi-trailer body including a rear underframe structure which includes a receiver member with a downwardly opening pocket forming a component of means to releasably lock a railroad bogie to said body, said underframe including transversely spaced supporting members adapted to bear upon a railroad bogie to support said body in roll;

a track-engaging railroad bogie including side frame members supporting dual wheel-set axle units and a central transverse bolster joining said side frame members, said means to releasably lock said railroad bogie to said body further including a bowl located centrally in said bolster, an adapter having a disc plate including a downwardly extending pin rotatably retained in said bolster bowl, said disc plate being disposed on top of said bolster, a lug extending upwardly from said disc plate and extendable into said receiver member pocket and means to releasably lock said upward lug in said receiver member to thereby releasably lock said railroad bogie to said semi-trailer body to the rear of said highway wheel-set axle unit; and



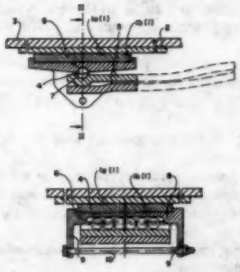
a female member opening horizontally at the rear end of said body for coupling to a male member at the front end of a similar body to couple the similar bodies end-to-end to form a train operable on tracks with said highway wheel-set axle units in their raised inoperative positions, and when said bodies are uncoupled, said highway wheel-set axle units are lowered to ground-engaging positions and said railroad bogie is detached from said body, said bodies being adaptable for connection to tractors for over-the-road highway travel.

4,955,293

SLIDER

Rolf Kramer, Siegen; Alfred Lohmann, Siegen-Eisern; Guido Bieker, Kirchhundem, and Herbert Budenbender, Netphen, all of Fed. Rep. of Germany, assignors to Waggon Union GmbH, Siegen, Fed. Rep. of Germany

Filed Mar. 1, 1989, Ser. No. 317,675
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1988, 3807547
Int. Cl.[5] B61F *5/14*
U.S. Cl. 105—199.3 10 Claims



5. A slider arrangement, in particular for track vehicles allowing for horizontal relative movement in longitudinal and

in latitudinal directions between a vehicle superstructure and a running gear arrangement, comprising: a slide plate fixedly connected to the vehicle superstructure, a slider friction element fixedly connected to a slider friction element support, said slider friction element having an upper friction sliding surface engaging a lower surface of said slide plate; vertically acting springs connected to the running gear; and, coupling means coupling said vertically acting springs and said slider friction element support and for substantially eliminating friction between the vertically acting springs and the slider friction element support in one of the two horizontal directions, said coupling means including coupling elements which allow nearly unrestricted sliding of the slider friction element support with respect to the running gear in one horizontal direction and which fixes immovably the slider friction element support with respect to the running gear in the other of the two horizontal directions.

4,955,294

FOLDABLE TABLE

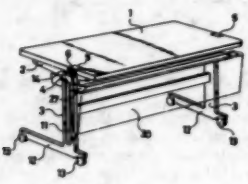
Taizo Abe, Ichikawa, Japan, assignor to Okamura Corporation, Japan

Filed Aug. 23, 1989, Ser. No. 397,580

Claims priority, application Japan, Dec. 28, 1988, 63-170335[U]

Int. Cl.[5] A47F 5/12

U.S. Cl. 108—6 **2 Claims**



1. A foldable table comprising:

a table top;

a frame member attached respectively to opposed side portions of a bottom surface of the table top and having a protruding piece adjacent each side portion projecting in a direction opposite to the table top;

a lock pin mounted on and projecting from an outer wall surface of each protruding piece;

a lock releasing lever rotatably attached to a bottom surface of the table top and disposed adjacent one of the protruding pieces;

a pair of legs, one being located adjacent each protruding piece;

a housing mounted on a top portion of each of the legs, each housing having a pivot pin projecting from an inner wall surface thereof and connected with the protruding piece of the frame member adjacent thereto in such a manner as to allow the protruding pieces to pivot about the pivot pins;

first click means rotatably housed within each housing and being adapted to be rotated in a direction to release a locking engagement when it is engaged by the lock releasing lever;

a first spring means energizing the first click means in a locking direction;

second click means rotatably housed in each housing and being adapted to be rotated in a direction to release a locking engagement when it is engaged by the first click means;

a second spring means energizing the second click means in a locking direction;

a locking disc rotatably housed in each housing and provided with a lock pin-engaging recess adapted to be detachable engaged with the lock pin, a pair of first engaging recesses adapted to be detachably engaged with the first click means to provide the locking engagement of the first click means, and a pair of second engaging recesses adapted to be detachably engaged with the second click means to provide the locking engagement of the second click means, the lock pin-engaging recess, the pair of first engaging recesses and the pair of second engaging recesses being located about the periphery of the locking disc for engagement with the first click means, the second click means and the locking pin, respectively;

a lock pin spring means energizing the locking disc in a direction to force it to disengage from the lock pin; and

connecting means interconnecting the first click means housed within each housing;

wherein a horizontal state of the table top is secured by engagement of the first and second click means with a first recess of the pair of first and second engaging recesses, respectively, and by a locking action of the lock pin engaged with the lock pin-engaging recess;

a slanted state of the table top is secured by engagement of the first and second click means with a second recess of the pair of the first and second engaging recesses, respectively, and by a locking action of the lock pin engaged with the lock pin-engaging recess; and

the table top is folded by releasing the locking engagement of the first and the second click means with the pair of first and second engaging recesses, respectively, thereby allowing the table top to be pivoted about the pivot pins to an erect position.

4,955,295

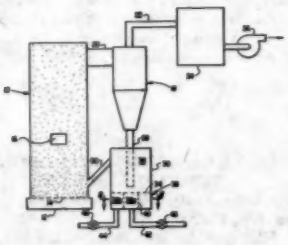
METHOD AND SYSTEM FOR CONTROLLING THE BACKFLOW SEALING EFFICIENCY AND RECYCLE RATE IN FLUIDIZED BED REACTORS

Iqbal F. Abdulally, Randolph, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.

Filed Aug. 18, 1989, Ser. No. 395,864

Int. Cl.[5] F23D 1/00

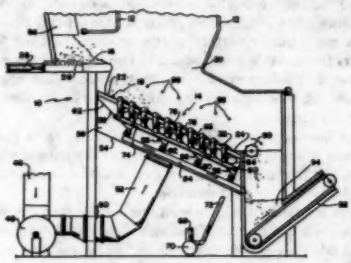
U.S. Cl. 110—263 **6 Claims**



1. A fluidized bed combustion system including separating means for receiving a mixture of flue gages and entrained particulate material from fluidized bed and separating said entrained particulate material from said flue gases, means for passing said separated flue gases from said separating means to a heat recovery unit, a seal vessel, a dipleg for passing said separated material from said separating means to said seal vessel, means for passing said separated material from said seal vessel back to said fluidized bed, and means for introducing air or gas to said seal vessel for fluidizing the separated material in said seal vessel to seal against the backflow of said separated material from said fluidized bed, through said dipleg and back to said separating means, said air introducing means comprises a first conduit for introducing air or gas into said seal vessel in a path aligned with the flow path of said separated material from said dipleg, and a second conduit for introducing air or

gas into an area of said seal vessel surrounding the flow path of air or gas from said first conduit.

4,955,296
INCINERATOR GRATE ASSEMBLY
James L. Barlow, 2618 Somerville Ct., Ft. Collins, Colo. 80526
Filed Dec. 1, 1988, Ser. No. 278,183
Int. Cl.[5] F23H 3/00
U.S. Cl. 110—300 10 Claims



1. An inclined grate assembly for the incineration of a feed material comprising:

a plurality of adjacent grate segments including at least one gas delivery tube having a plurality of apertures therethrough and wherein said gas delivery tube includes an upper surface with at least certain of said apertures projecting upstream of said inclined grate assembly,

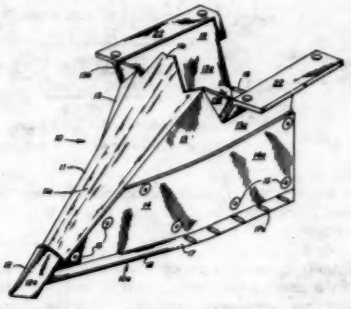
a downwardly inclined grate plate extending from said tube and including a plurality of openings therethrough,

gas supply means joined to said gas delivery tubes and adapted to admit gas into said tubes and thence through said apertures, and

said gas supply means including adjustable control means operable to regulate the volume of gas through said tube apertures, whereby

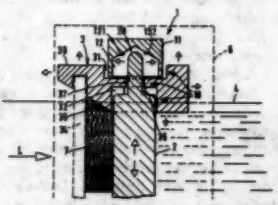
upon manipulation of said control means, the effectiveness of the movement and burn of feed material atop said grate assembly may be maximized.

4,955,297
SEEDING PLANTER SHOE FOR AGRICULTURAL PLANTERS
Masa Tsukamoto, 99 W. 1000 North, Blackfoot, Id. 83221
Filed Sep. 5, 1989, Ser. No. 402,892
Int. Cl.[5] A01C 5/06; A01B 15/00
U.S. Cl. 111—152 6 Claims



1. A seed planter shoe comprising a prow piece of substantially V-shape in cross section sloping and diverging backwardly and upwardly of the shoe for parting the soil along a lower, furrowing portion and with minimum lateral compression thereof to provide a furrow below an upper trash and soil lifting portion thereof; a shoe proper extending rearwardly from said prow piece and having a pair of side walls diverging upwardly and backwardly with said prow piece for from about one-half to about three-quarters of the length of the shoe; furrowing portions of said side walls continuing on longitudinally of the shoe substantially in parallel for the remainder of the length of the shoe, said side walls being rigidly connected at their forward ends to said prow piece inwardly of and at the side edge margins thereof and extending upwardly from adjacent to the bottom thereof to substantially the upper end thereof so as to be essentially integral therewith, furrowing portions of said side walls that are located backwardly of the upper end of said prow piece extending only partly to such upper end of said prow piece; a pair of relatively widely divergent side wall extensions rising from the upper ends of said furrowing portions of the side walls to substantially the top of the shoe but below the upper end of the prow piece, the bottom of said shoe proper being substantially planar and the apex of said prow piece sloping backwardly at an angle to said bottom of from about forty-five to about fifty degrees, so soil and trash will be lifted by and along said prow piece up and out of the furrow provided by said furrowing portions of said side walls; a pair of trash-diverting forwardly facing wall portions joining rearward edges of said forward portions of the side walls with forward edges of said outwardly divergent side wall extensions; and a toe piece fastened to said prow piece and depending therefrom below the bottom of said shoe proper.

4,955,298
ROLLER DOCTOR OR SQUEEGEE APPARATUS FOR APPLYING FLUID MATERIAL TO A SUBSTRATE
Johannes Zimmer, Ebentaler Strasse 133, 9020 Klagenfurt; Franz Gütler, Klagenfurt, and Engelbert Mörtl, Rottenmann, all of Austria, assignors to Johannes Zimmer, Klagenfurt, Austria
PCT No. PCT/EP88/00493, § 371 Date Mar. 15, 1989, § 102(e) Date Mar. 15, 1989, PCT Pub. No. WO88/09725, PCT Pub. Date Dec. 15, 1988
PCT Filed Jun. 3, 1988, Ser. No. 328,081
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 8708044; Jun. 30, 1987, 8709029
Int. Cl.[5] B41F 15/44
U.S. Cl. 101—120 28 Claims



1. A roller doctor apparatus (1) for applying fluid material over an application area on a substrate with at least one doctor roller (2) magnetically attracted into engagement with the substrate for exerting pressure thereagainst, said roller extending in the longitudinal direction of the apparatus; roller supporting and guiding members (11) arranged laterally on the apparatus, said doctor roller (2) being held at its ends between said members (11) for rotation and for limited movement relative thereto, wherein the doctor apparatus (1) comprises at least one roller fixing part (3) with an indentation on each side thereof, said part fitted loosely onto one end of the doctor roller (2) and trapped between the roller and the roller sup-

porting and guiding member, and wherein the member (11) projects into one of said indentations with the roller projecting into the other indentation to form a plug connection (10).

4,955,299

WEB PRINTING PRESS WITH REPLACEABLE PRINT UNIT

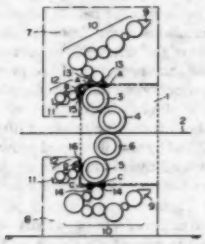
Hirotake Ohta, Kanagawa, Japan, assignor to Taiyo Kikai Ltd., Tokyo, Japan

Continuation of Ser. No. 182,348, Apr. 18, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 438,243

Claims priority, application Japan, Sep. 9, 1987, 62-224059

Int. Cl.[5] B41F *7/04, 7/12, 31/30*

U.S. Cl. 101—143 **10 Claims**



1. A web printing press comprising:

a first printing unit disposed between an upper ink feeding unit and a lower ink feeding unit in a vertical arrangement so that said upper and lower ink feeding units face each other;

said first printing unit including upper and lower blanket cylinders for rotatably contacting a horizontally disposed web therebetween for printing on opposite surfaces of said web, and upper and lower plated cylinders being rotatably in contact with said upper and lower blanket cylinders, respectively;

said upper ink feeding unit including an ink fountain, a water fountain and associated ink and water transfer rollers for feeding ink and water respectively to said upper plated cylinder, said ink fountain and said water fountain of said upper ink feeding unit each being disposed in horizontal planes parallel to said web to provide a predetermined vertical distance between said ink fountain and said water fountain of said upper ink feeding unit;

said lower ink feeding unit including an ink fountain, a water fountain and associated ink and water transfer rollers for feeding ink and water respectively to said lower plated cylinder, said ink fountain and said water fountain of said lower ink feeding unit each being disposed in horizontal planes parallel to said web to provide a predetermined vertical distance between said ink fountain and said water fountain of said lower ink feeding unit;

said ink fountain of said upper ink feeding unit being in vertical alignment with said ink fountain of said lower ink feeding unit;

said water fountain of said upper ink feeding unit being in vertical alignment with said water fountain of said lower ink feeding unit;

said blanket cylinders and said plated cylinders each having a diameter of a predetermined size;

said upper plated cylinder being disposed above said upper blanket cylinder, and said lower plated cylinder being disposed below said lower blanket cylinder so that said first printing unit has a predetermined maximum vertical dimension;

first means to permit said first printing unit to be replaced by at least a second printing unit having a predetermined maximum vertical dimension larger than said predetermined maximum vertical dimension of said first printing unit;

said second printing unit including upper and lower blanket cylinders and upper and lower plated cylinders arranged in the same manner as said blanket cylinders and said plated cylinders of said first printing unit;

said blanket cylinders and said plated cylinders of said second printing unit each having a diameter of a predetermined size which is larger than said diameter of each of said blanket cylinders and said plated cylinders of said first printing unit;

second means vertically moving at least one of said ink feeding units from a first position to a second position to provide a larger vertical space between said ink feeding units for receiving said second printing unit between said upper and lower ink feeding units so that said upper and lower ink feeding units continue to face each other in said second position;

said at least one ink feeding unit having the same predetermined vertical distance between said horizontal planes of said ink fountain and said water fountain thereof in both said first and second positions;

said ink fountain of said at least one ink feeding unit moving in a vertical direction from said first position to said second position to maintain said vertical alignment with said ink fountain of the other ink feeding unit when in said second position;

said water fountain of said at least one ink feeding unit moving in a vertical direction from said first position to said second position to maintain said vertical alignment with said water fountain of the other ink feeding unit when in said second position; and

said second means vertically moving said at least one ink feeding unit back to said first position for receiving said first printing unit between said upper and lower ink feeding units when replacing said second printing unit;

whereby said web printing press can separately use, one at a time, a plurality of printing units each having a different predetermined maximum vertical dimension.

4,955,300

ADAPTIVE CARTRIDGE FOR A SUBCALIBER BARREL SYSTEM

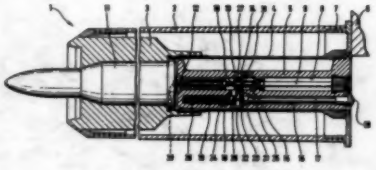
Roland Bertiller, Schramberg, and Roland Maier, Staig-Altheim, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

Filed Oct. 27, 1989, Ser. No. 428,196

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1988, 3836529

Int. Cl.[5] F42B *8/10;* **F41A** *21/10*

U.S. Cl. 102—446 **5 Claims**



1. An adaptive barrel of a subcaliber barrel system for firing subcaliber ammunition out of a large caliber weapon barrel, comprising:

a tubular casing;

a centrally disposed cartridge bearing connected to said tubular casing and defining a central cavity for positioning subcaliber ammunition cartridge within the adaptive barrel;

a firing pin case positioned adjacent said cartridge bearing, coaxial therewith, said firing pin case being positively

connected to said cartridge bearing at a lock side of said cartridge bearing;

a firing pin having an end bordering a weapon breech mechanism with an axial extension adjacent a cap of a cartridge, said firing pin disposed in an axial bore defined by said firing pin case;

a safety rod disposed in a safety rod axial bore defined by said firing pin case, said firing pin case defining a radial bore connecting said firing pin axial bore and said safety rod axial bore;

a guide member disposed in said firing pin axial bore connected to said firing pin axial extension; and, a slide member connected to said safety rod and connected to said guide member for moving said slide member and said guide member and in turn for moving said axial extension into and out of contact with the cap of said cartridge upon movement of said safety rod, said firing pin axial extension receiving electrical energy from the weapon via said firing pin.

4,955,301

TIE EXCHANGE MACHINE

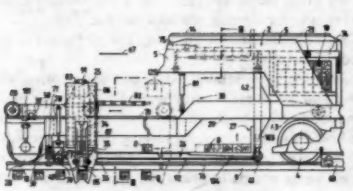
Josef Theurer, Vienna; Johann Hansmann, Klosterneuburg, and Herbert Wörgötter, Linz, all of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Continuation of Ser. No. 165,512, Mar. 8, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 374,576

Claims priority, application Austria, Jul. 23, 1987, 1873/87

Int. Cl.[5] E01B *29/10*

U.S. Cl. 104—7.2 **21 Claims**



1. A machine for exchanging a group of at least one old tie for a group of at least one new tie in a railroad track consisting of two rails fastened to ties, which comprises

(a) a self-propelled standard railroad vehicle comprising

(1) a bridge-like machine frame,

(2) undercarriages supporting the machine frame for mobility on the railroad track, the machine frame defining an upwardly recessed portion between the undercarriages,

(3) a drive for advancing the vehicle in an operating direction, and

(4) an operator's cab,

(b) a tie exchanging device connected to the machine frame and arranged within sight of the operator's cab, the tie exchanging device being operable for withdrawing the old ties and inserting the new ties and comprising

(1) a longitudinally adjustable tie gripping means including a tie clamp for gripping an end of the ties laterally projecting from the track,

(2) a drive for longitudinally adjusting the tie gripping means for respectively moving the old ties laterally out of, and inserting the new ties laterally into, the track, and

(3) respective drives for vertically adjusting and for operating the tie clamp between tie engaging and tie releasing positions.

(c) a drive connected to the tie exchanging device for longitudinally displacing the device in the operating direction with respect to the machine frame,

(d) vertical tie conveyor connected to the machine frame and arranged adjacent the tie exchanging device,

(1) the tie exchanging device and vertical tie conveyor being arranged within the recessed frame portion; and

(e) a tie transporting device arranged between the tie exchanging device and the vertical tie conveyor,

(1) the vertical tie conveyor and the tie transporting device being arranged to receive, convey and transport the ties positioned transversely to the track.

4,955,302

MOBILE TIE GANG APPARATUS

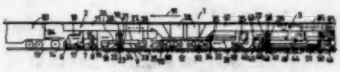
Josef Theurer, Vienna, and Johann Hansmann, Klosterneuburg, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Continuation of Ser. No. 165,511, Mar. 8, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 380,703

Claims priority, application Austria, Jul. 23, 1987, 1871/87

Int. Cl.[5] E01B *29/10*

U.S. Cl. 104—7.2 **4 Claims**



4. The mobile apparatus for sequentially exchanging selected consecutive groups of old ties in an existing railroad track for groups of new ties while retaining groups of old ties therebetween to support the mobile apparatus on the track, which comprises

(a) a succession of bridge-like work vehicles coupled together to form a train including a first, second, third and fourth work vehicle, each work vehicle having

(1) a frame defining an upwardly recessed portion between respective ends thereof,

(b) swivel trucks supporting the work vehicle frame ends on the railroad track,

(1) the third work vehicle having the respective frame ends thereof supported on a rear one of the swivel trucks of the second work vehicle and a front one of the swivel trucks of the fourth vehicle,

(c) a continuous guide track extending atop the work vehicle frames,

(d) a power-driven crane movable along the guide track for transporting the ties,

(e) a drive for the continuous advancement of the train on the railroad track in an operating direction,

(f) a succession of individual devices operative to effectuate different sequential operations for exchanging the selected old ties for the new ties, the tie exchanging devices being mounted for longitudinal displacement and including

(1) first and second tie pulling and inserting devices mounted within view of an operator's accommodation in the recessed frame portion of the second and fourth work vehicle, respectively, and having tie gripping means for gripping an end of the ties laterally projecting from the track, the first device pulling the selected old ties laterally out of the track and the second device inserting the new ties laterally into the track,

(2) a track-bound spike puller mounted in the recessed frame portion of the first work vehicle,

(3) a tie plate transporting device mounted in the recessed frame portion of the second work vehicle, the tie plate transporting device including drive means for lifting respective ones of the tie plates,

(g) a respective drive for displacing each tie exchanging device with respect to the respective work vehicle frame along a displacement path extending in the direction of the longitudinal extension of the work vehicle frame,

(h) a respective vertical tie conceyor associated with each of the first and second tie pulling and inserting devices,

(i) a track-bound spike collecting device arranged in the recessed frame portion of the first work vehicle to receive spikes pulled by the spike puller,

(j) a track-bound self-propelled ballast clearing device longitudinally displaceably mounted in the recessed frame portion of the first work vehicle, the ballast clearing device including an operator's cab, a tie extractor and a track lifting mechanism,

(k) a self-propelled tie tamping device longitudinally displaceably mounted in the recessed frame portion of the fourth bridge-like work vehicle and succeeding the tie inserting device, the tie tamping device comprising a ballast sweeping brush,

(l) a further operator's cab on the fourth bridge-like work vehicle, the tie tamping device preceding the further operator's cab,

(m) a self-propelled device for clearing and planing ballast serving to support the new tires and filling cribs therebetween, the ballast clearing and planing device being mounted on the third work vehicle, and

(n) a storage space for the selected old ties and the new ties respectively above the rear and front swivel trucks.

4,955,303

LINEAR MOTOR FEEDER SYSTEM

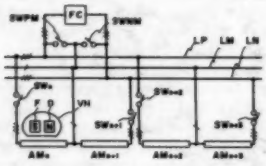
Haruo Ikeda, Musashino, Japan, assignor to Railway Technical Research Institute, Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,801

Claims priority, application Japan, Mar. 30, 1988, 63-74492

Int. Cl.[5] B60L *13/00*; H02K *41/00*

U.S. Cl. 104—292 **3 Claims**



1. A feeder system for a linear motor having field electrodes disposed on a vehicle and a plurality of stationary armature coils, comprising:

first, second and third feeder lines in parallel with one another;

a frequency converter connected across said first and second feeder lines for supplying electricity to the armature coils, wherein said armature coils are serially connected two-by-two to form sets of said armature coils such that a junction between two armature coils of each set is connected to said third feeder line, and such that opposing ends of each set, remote from said junction, are respectively connected to said first and second feeder lines through respective switches corresponding to the armature coils of said set;

a first short-circuiting switch disposed between said first and third feeder lines; and

a second short-circuiting switch disposed between said second and third feeder lines.

4,955,304

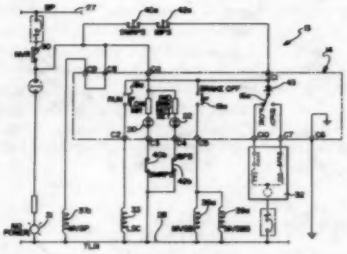
REMOTE LOCOMOTIVE SPOTTER CONTROL

Robert E. Spenk, Des Plaines; Psai A. Vazifdar, Bolingbrook, and John A. Janowski, Jr., Western Springs, all of Ill., assignors to General Motors Corporation, Detroit, Mich.

Filed May 25, 1989, Ser. No. 357,131

Int. Cl.[5] B60L *15/42*

U.S. Cl. 104—296 **16 Claims**



8. A remote spotter for a self powered rail locomotive having an engine drivingly connected to an electric power main generator, a traction motor for driving the locomotive when supplied with power from the main generator, air brakes for stopping the locomotive and an on board battery for auxiliary electric power, said spotter comprising:

auxiliary drive means for connecting the battery to the traction motor for driving the locomotive,

auxiliary brake means for applying the air brakes to stop the locomotive, and

a remote unit connectable with said locomotive auxiliary drive and brake means and normally operative upon such connection to actuate the auxiliary brake means to apply the brakes, said remote unit having first and second manually actuated self released control means, said first control means being normally operative upon actuation to release the brakes and said second control means being normally operative upon actuation to actuate the auxiliary drive means to move the locomotive.

4,955,305

MODULAR SYSTEM FOR USE WITH X-Y PERIPHERALS

Steven F. Garnier, Denver; Robert B. Ton; Vernon S. Turner, both of Arvada; James K. Pilarski, Northglenn; Mark R. Magill, Arvada, and Allen J. Murphy, Denver, all of Colo., assignors to Melco Industries, Inc., Denver, Colo.

Filed Sep. 23, 1988, Ser. No. 249,426

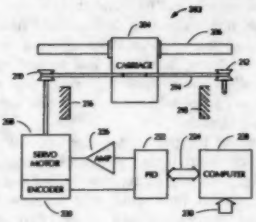
Int. Cl.[5] D05B *21/00*

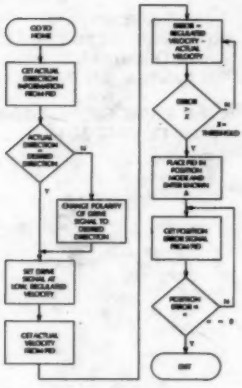
U.S. Cl. 112—121.11 **7 Claims**

1. A method for moving a carriage in a sewing machine from a random position to a reference position relative to a stationary body, comprising:

moving a carriage in a first direction from a random position towards a known position;

using a signal to determine when said carriage reaches said known position; and





moving said carriage in a second direction a known distance to a reference position.

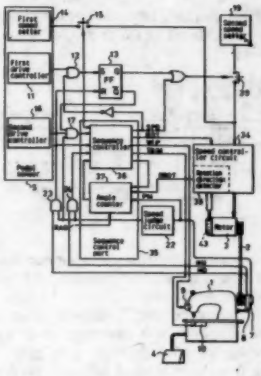
4,955,306

SEWING MACHINE

Tadashi Sato, Hirakata, and Shigeo Neki, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 12, 1988, Ser. No. 218,008
Claims priority, application Japan, Jul. 14, 1987, 62-175179
Int. Cl.[5] D05B *69/18, 69/22*
U.S. Cl. 112—275 **4 Claims**

1. A sewing machine comprising:
a sewing mechanism including a thread trimmer,
an electric motor for driving said sewing mechanism,
a speed detector for detecting rotation speed of said sewing mechanism by issuing a predetermined number of speed signal pulses during one sewing period,
a needle position detector for detecting the position of a sewing needle,
a speed controller circuit for controlling rotation speed and stopping position of said sewing mechanism,
a sequence control part for controlling sequential operation of said sewing machine, including
a sequence controller for controlling at least said thread trimmer,
an angle counter for counting the angle of rotation of said sewing mechanism by counting said speed signal pulses, and



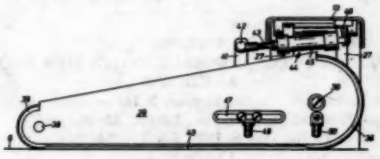
reverse rotation means for making reverse rotation of said motor for a predetermined angle after completion of thread trimming by said thread trimmer.

4,955,307

DEVICE ON SEWING MACHINES FOR THE TRANSPORT OF WORK PIECES

Wolfgang Kolb, Sippersfeld, and Ernst Albrecht, Hochspeyer, both of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Kaiserslautern, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,260
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1988, 3819262
Int. Cl.[5] D05B *33/00*
U.S. Cl. 112—304 **11 Claims**



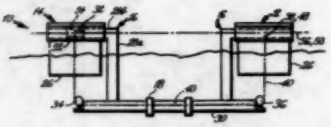
1. A workpiece transport device for sewing machines, comprising:
a table top extending from a sewing area to a transfer area;
a pivotal arm;
a deflection disc connected to a first end of said pivotal arm;
a drive disc connected to a second end of said pivotal arm;
a conveyor belt looping around said deflection disc and said drive disc; and
swivel carrier means connected to a swivel carrier actuator and connected to said pivotal arm, said swivel carrier means for pressing said pivotal arm onto a workpiece on said table top with a predetermined force and pressing said pivotal arm onto the workpiece with a force less than said predetermined force, depending upon the position of the workpiece relative to the conveyor belt when the arm is in a swivelled-up position.

4,955,308

FLOATING BOAT LIFT

Gary D. Craddock, 4942 Commonwealth Dr., Sarasota, Fla. 34242

Filed Jan. 30, 1990, Ser. No. 472,098
Int. Cl.[5] B63B *35/34*
U.S. Cl. 114—45 **10 Claims**



1. A floating boat lift for lifting and supporting a boat above the surface of a body of water comprising: p1 first and second elongated buoyant pontoons;

first and second generally U-shaped, spaced apart, rigid transverse supports each having a lower generally horizontal elongated mid portion, side portions upwardly extending from each end of said mid portion, and upper horizontal end bearing portions coaxial one to another about a first and second transverse axis and outwardly extending from the upper ends of each said side portion;

each said mid portion connected to a boat cradle atop which the boat is supportable;

two of said end bearing portions on one side of said mid portions held for rotation about spaced apart parallel said first and second axes within said first pontoon, the other two said end portions on the other side of said mid portions also held for rotation about said first and second axes within said second pontoon whereby said first and second pontoons are held in spaced apart relationship on either side of said first and second transverse supports;

said first and second transverse supports pivotable by rotation about said end bearing portions within said first and second pontoons between a first position wherein said cradles are elevated above the surface of the water and a second position wherein said cradles are submerged and wherein movement of each mid portion is along an arch having a radius generally equal to the length of said side portions;

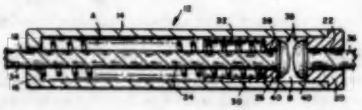
cable means connected between a winch and each said mid portion for moving said transverse supports in unison between said first and second positions.

4,955,309

YIELDABLE LINE ASSEMBLY AND IN LINE SHOCK ABSORBER

Frank E. Ciccone, Center Harbor, N.H., assignor to International Nautical Supplies, Inc., Boston, Mass.

Filed May 8, 1989, Ser. No. 348,946
Int. Cl.[5] B63B *21/00*
U.S. Cl. 114—230 **4 Claims**



1. A yieldable line assembly of the type employed to moor boats, to tie sails and canvasses, etc. comprising:

an elongated tubular housing having opposite ends closed by first and second walls respectively provided with axially aligned first and second openings extending therethrough;

a plunger member contained within said housing for axial movement therein, said plunger member having a third wall with a third opening extending therethrough and aligned axially with said first and second openings, said third wall being configured and dimensioned to subdivide the interior of said housing into first and second chambers;

a resilient coiled compression spring confined in said first chamber between said first and third walls;

a first flexible line, extending through said first opening and said coiled spring and said third opening, with an end of said first line being located in said second chamber;

a second flexible line extending through said second opening, with an end of said second line also being located in said second chamber; and

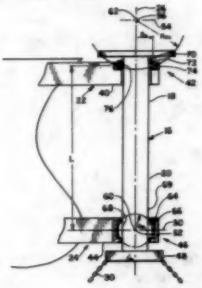
anchoring means for preventing the ends of said first and second lines from being withdrawn from said second chamber respectively through said third and second openings, whereupon tensioning said lines will cause said spring to be compressed between said first and third walls as said first line is withdrawn from said first chamber.

4,955,310

BEARING ARRANGEMENT FOR SINGLE POINT TERMINAL

Jack Pollack, 23901 Calabasas Rd., #2090, Calabasas, Calif. 91302

Filed Dec. 8, 1988, Ser. No. 282,020
Int. Cl.[5] B63B *21/50*
U.S. Cl. 114—230 **14 Claims**



1. In a mooring arrangement which includes a vessel that floats at the surface of a sea and that can drift and weathervane, a turret, and vertically spaced upper and lower mounts mounting vertically spaced upper and lower portions of the turret to the vessel to enable relative rotation of the vessel and turret about a largely vertical axis, and wherein the turret has a lower end anchored by at least one mooring line or the like extending down toward the sea floor and applying a largely downward force to the lower end of the turret, the improvement wherein:

said lower mount includes a lower bearing arrangement that limits radial movement of said turret with respect to said axis while allowing pivoting of said lower turret portion about lower horizontal axes;

said upper mount includes an upper bearing arrangement that limits both radial and downward movement of said turret with respect to said axis while allowing a substantial amount of pivoting of said upper turret portion about upper horizontal axes.

4,955,311

FOLDAWAY FLOATING DOCK

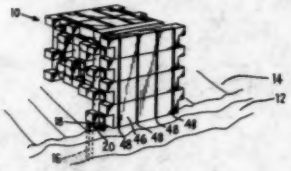
William B. Barber, 9613 Woodlawn Dr., Portage, Mich. 49002

Filed Nov. 18, 1988, Ser. No. 273,195
Int. Cl.[5] B63C *1/00*
U.S. Cl. 114—263 **15 Claims**

1. A foldaway floating dock for use on a body of water, comprising:

a plurality of floatable dock sections; and

a frame for interconnecting said plurality of dock sections, said frame including first means for slidably supporting each of said plurality of dock sections for movement away from and toward a mutually adjacent said dock section between a first position generally abutting said mutually adjacent dock section and a second position spaced from



said mutually adjacent dock section, said frame further including second means for facilitating pivotal movement of each said dock section relative to a respective said mutually adjacent dock section and operable only when said dock section is in said second position to thereby effect a folding of said dock section upon said respective mutually adjacent dock section.

4,955,312

CONTROLLED GEOMETRY HYDROFOIL BOAT

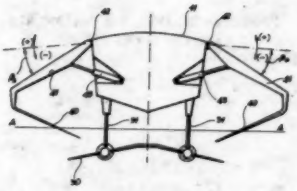
Alfredo Magazzu', Palermo, Italy, assignor to Rodriquez S.p.A., Messina, Italy

Continuation of Ser. No. 26,957, Mar. 17, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 279,284

Claims priority, application Italy, Apr. 4, 1986, 12456 A/86

Int. Cl.[5] B63B *1/22*

U.S. Cl. 114—280 **2 Claims**



1. In a variable geometry hydrofoil boat having a hull and hydrofoils for operating hullborne and foilborne, the improvement comprising, secant foils operable to a fully raised position outside of the hull and out of the water for operating hullborne or foilborne and to variable lowered positions in which the secant foils are foilborne, means comprising a pair of arms articulated on said hull for movement relative to corresponding opposite sides thereof for each pivotally mounting a corresponding secant foil on the hull and fixed relative to the corresponding arm, means for moving the arms angularly relative to the corresponding opposite sides of the hull for alternatively moving the corresponding secant foil to said fully raised position in which the secant foils are in a non-operative condition relative to lifting of the hull but ready to intervene, and to said variable lowered position in which the secant foils contribute dynamically to lifting the hull, said means for moving said arms comprising hydraulic jacks each connected to a corresponding arm for variably angularly moving the arm relative to the hull, and said jacks are connected to the pair of arms for independently angularly moving the arms for selective independent positioning of each secant foil in variably selected raised and lowered positions.

4,955,313

HEIGHT-ADJUSTABLE ROOF FOR A PILOT HOUSE/HELM STATION

Alfred E. Terry, III, 79th St. Boat Basin, New York, N.Y. 10024

Filed Jul. 3, 1989, Ser. No. 374,878

Int. Cl.[5] B63B *29/02*

U.S. Cl. 114—361 **19 Claims**

1. A helm station/pilot house for a boat, comprising:

a front wall, pair of side walls, and a rear wall coupled together to form a protective enclosure, each said wall defining an upper edge surface;

a radar arch projecting upwardly from at least the upper edge surface of one of said pair of side walls and said rear wall, said radar arch comprising a first upstanding side post projecting upwardly from one lateral side of said enclosure, and a second upstanding side post projecting upwardly from the other lateral side of said enclosure, and a cross member interconnecting the upper edge surfaces of said first and second side posts;

a slidably adjustable roof operatively coupled to said first and second upstanding side posts of said radar arch, said roof having a pair of laterally spaced-apart openings through which project said first and second upstanding side posts, whereby said roof is slidable with respect to said first and second upstanding side posts ; and

means for selectively and releasably retaining said roof at at least one elevated position positioned above said upper edge surfaces of said walls of said enclosure, whereby said roof may be elevated to expose the interior of the enclosure to the ambient surroundings.

4,955,314

WATER SPORT BOARD SAFETY TIP WITH ATTACHMENT FACILITATING EXTENSIONS

David Skedeleski, and Eric Arakawa, both of Aiea, Hi., assignors to Surfco of Hawaii, Aiea, Hi.

Filed Jul. 18, 1989, Ser. No. 381,204

Int. Cl.[5] A63C *15/05*

U.S. Cl. 114—219 **20 Claims**

1. In combination with a water sport board of the type having a sharply angled forward tip portion, including a top, bottom, and tapered sides; means for affording protection to the user of the board from injury upon contact with said tip portion while not adversely altering the performance characteristics of the board, said means comprising:

an integral relatively soft, resilient, plastic tip cover, having a rounded exterior nose portion;

a main body portion engaging said tip, bottom, and tapered sides; and

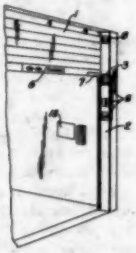
upper and lower extension portions extending rearwardly from said body portion, past the rearwardmost point of said main body portion, and engaging only said top and bottom; said tip cover being fixedly secured to said tip portion of said board.

4,955,315

LARGE VEHICLE ENTRANCE DOOR SAFETY SYSTEM AND METHOD

James F. Lee, 218-12 43rd Ave., Bayside, N.Y. 11361

Filed May 4, 1989, Ser. No. 347,520
Int. Cl.[5] B60T *13/00*
U.S. Cl. 116—28 R **11 Claims**



10. A large vehicle entry door safety system for a vertical sliding entry door having a bottom edge, a door frame perpendicular to said door and an outer side wall parallel to said door which comprises:

a plurality of ruled marks positioned on said door frame and on said outer wall;

at least one symbol visually indicating a specific vehicle type positioned at a clearance height associated with said vehicle on said door frame and said side wall;

a position indicating means comprising a rod attached to said door edge and parallel to said door frame and bent at an end so as to be parallel to said side wall and associated with said marks so as to visually indicate by alignment with said marks and symbol said clearance height to a vehicle operator or door operator or both;

a warning mark attached to said door and to any vehicle using said door, said warning mark directing attention to said position indicating means;

a door height control means;

instructions positioned near said door height control means indicating to align said position indicating means with said marks and symbol.

4,955,316

DEVELOPING DEVICE

Masato Asanuma; Masatoshi Kaneshige, and Toyoka Aimoto, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 20, 1989, Ser. No. 382,868
Claims priority, application Japan, Aug. 8, 1988, 63-198526; Aug. 8, 1988, 63-198527
Int. Cl.[5] G03G *15/09*
U.S. Cl. 118—657 **11 Claims**

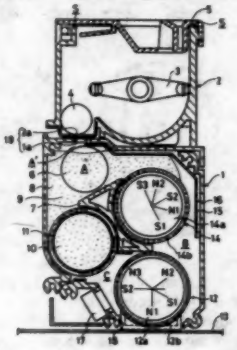
1. A developing device comprising:

A. a developing magnet roller for feeding developer onto a photoreceptor;

B. a shutter mechanism for switching from feeding developer to the developing magnet roller to suspending the above feed of developer, or vice versa;

C. a delivery magnet roller for receiving developer from the developing magnet roller and conveying it to a path leading to the shutter mechanism;

D. a toner feed path for interconnecting a toner hopper disposed at the upper end of a main body of the developing device and the space above the shutter mechanism; and



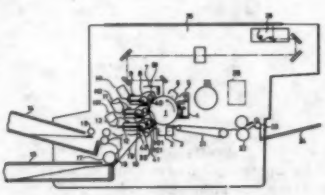
E. an interconnecting path for interconnecting the space in the vicinity of the toner feed path within the main body and a different space existing within the main body.

4,955,317

IMAGE FORMING APPARATUS HAVING A PLURALITY OF DEVELOPING UNITS EACH CONTAINING TWO-COMPONENT DEVELOPER

Naoyoshi Kinoshita, and Yoshihiko Hatta, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1989, Ser. No. 357,894
Int. Cl.[5] G03G *15/08*
U.S. Cl. 118—689 **22 Claims**



1. An electrophotographic image forming apparatus employing a two-component developer including toner and carrier, comprising:

a developing unit containing the two-component developer;

a toner concentration sensor provided on said developing unit for detecting concentration of the toner included in the developer;

comparing means for comparing a value detected by said toner concentration sensor with a prescribed concentration reference value;

supplying means for supplying toner to said developing unit;

controlling means for controlling supply of toner by said supplying means based on a result of comparison by said comparing means; and

detecting means for detecting whether or not a detachable member, whose presence/absence influences detection of said toner concentration sensor, is attached near said developing unit; wherein

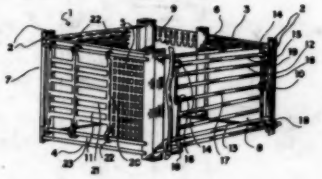
said controlling means changes an amount of toner supplied by said supplying means based on the value detected by said toner concentration sensor in response to a detection output from said detecting means.

4,955,318

TRANSPORTABLE POULTRY PLANT CART

John W. Melhorn, and J. Michael Melhorn, both of Box 258, Mount Joy, Pa. 17552

Filed Jan. 27, 1989, Ser. No. 302,415
Int. Cl.[5] A01K *31/07*
U.S. Cl. 119—17 **4 Claims**



1. A method of transporting and unloading animals including the following steps:

providing a plurality of animal cages having four vertical sides and a top and bottom for carrying individual animals, each said cage having first and second separate closable entrances for placing and removing animals, said closable entrances being disposed on adjacent vertical sides of said cage;

stacking said plurality of cages in a vertical manner upon a wheeled cart;

placing animals inside each said cage through said first entrance;

transporting said cages and animals upon said wheeled cart to a destination;

tilting said stack of cages until they lie in a generally horizontal disposition with said second entrances facing vertically upwards;

removing said animals through said second entrances; whereby

a person removing said animals through said second entrances can quickly remove the animals from the cages without having to change levels and the animals and cages are transportable in a standard vertically stacked manner.

4,955,319

BIRD FEEDER

Robert J. Brucker, Bernardsville, N.J., assignor to Seal Spout Corporation, Liberty Corner, N.J.

Filed Oct. 12, 1988, Ser. No. 256,742
Int. Cl.[5] A01K *39/014*
U.S. Cl. 119—52.2 **10 Claims**

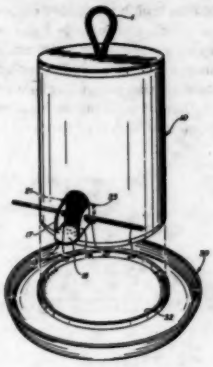
1. A container comprising:

a body having closed bottom surface, top and side walls;

spout means formed in said side walls;

said spout means having apertures formed therein for supporting a perch means therein;

feeding trough means attached to said bottom surface, said trough means comprising a feeding surface, internal rim means formed on said feeding surface for overfitting said



bottom surface and external rim means formed on said feeding surface spaced from said internal rim means.

4,955,320

DISPENSER FOR STRING FOR BIRD NESTS

Samuel G. Zaccone, 1315 North 13th Avenue, Melrose Park, Ill. 60160

Filed Feb. 27, 1989, Ser. No. 315,494
Int. Cl.[5] A01D *29/00*
U.S. Cl. 119—57.8 **4 Claims**

1. In combination

a bundle of pre-cut lengths of string,

a housing including an exterior wall having an opening therein,

said bundle extending into said opening in a direction transverse to said wall,

vertically disposed guide means in said housing, and

string retention means slidably carried in said guide means for vertical movement at least partially across said opening to engage said bundle and press same against a portion of said housing defining said opening.

4,955,321

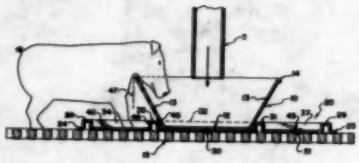
COLLECTION TRAY FOR AN ANIMAL FEEDER

Joseph A. Waldner, Lander, Canada, assignor to J & R Livestock Consultants Ltd., Winnipeg, Canada

Filed Aug. 30, 1989, Ser. No. 400,539
Int. Cl.[5] A01K *1/10*
U.S. Cl. 119—61 **3 Claims**

1. A feed system for animals comprising a feeder having a trough including a base wall onto which the feed can rest and a front wall inclined upwardly and forwardly from a front edge of the base wall to a front edge of the front wall over which the animal reaches for taking feed from the base wall of

the trough and means for supplying feed into the trough, a perforated floor on which the animal stands at the feeder and a tray member separate from the feeder positioned between the feeder and the floor on which the feeder rests with a portion of the tray member extending outwardly from said front edge of the base all, the tray member having substantially flat horizontal surface for resting on the floor underneath the side edge and a plurality of upstanding ribs projecting upwardly from the flat horizontal surface thereof defining at least one compartment on the tray member into which feed dropped by the animal can



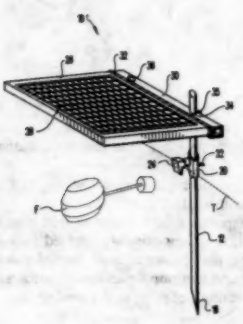
fall for collection, the ribs including a first elongate rib arranged so as to extend parallel to the front edge of the base wall of the feed trough with a rear edge of the first rib substantially in contact with the full length of the front wall at a position adjacent the base wall and a front edge of the first rib spaced rearwardly of a vertical plane containing the front edge of the front wall, a second elongate rib along substantially a front edge of the tray member parallel to and spaced from the first rib and a plurality of transverse ribs extending from said second rib to said first rib thus dividing the space between into separate compartments.

4,955,322

FLOAT GUARD FOR A LIVESTOCK WATERING TROUGH

Frank N. Rodriguez, 801 N. 9th St., Alpine, Tex. 79830

Filed Mar. 29, 1989, Ser. No. 330,064
Int. Cl.[5] A01K *7/00*
U.S. Cl. 119—78 **1 Claim**



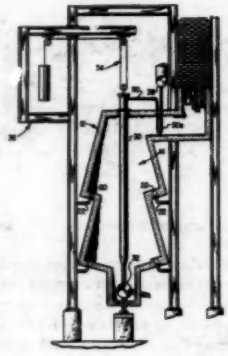
1. A float guard for a livestock watering trough, comprising:
a rigid frame;
a wire mesh covering said frame;
a mounting bar pivotally secured to said frame;
at least one ground insertion spike perpendicularly received through an aperture in said mounting bar;
said frame mounted for pivotal movement on said mounting bar for movement about an axis perpendicular to said ground insertion spike;
a set screw in threaded engagement with said mounting bar and moveable into clamping engagement with said ground insertion spike for securing said mounting bar at a selected position along said ground insertion spike;
at least one vertically adjustable trough clamp, said trough clamp having a threaded clamping jaw for frictionally engaging a side wall of a watering trough; and
clamping means adjustably securing said trough clamp at a selected adjusted position on said ground insertion spike.

4,955,323

FIRED HEATER

Janusz B. Ziemiasek, Washington Crossing, Pa., assignor to Foster Wheeler USA Corporation, Clinton, N.J.

Division of Ser. No. 71,825, Jul. 10, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 307,021
Int. Cl.[5] F22B *1/02*
U.S. Cl. 122—4 D **3 Claims**



1. A fired heater comprising an enclosure defining a chamber, at least one catalyst-filled tube having a first portion extending in said chamber and a second portion extending externally of said enclosure, means disposed externally of said enclosure for receiving fluid, a conduit having a first end portion connected to said means for receiving fluid, a second end portion connected to said second portion of said tube, and an intermediate portion extending in said chamber, and means for applying heat to said chamber for preheating the fluid in said intermediate portion of said conduit and heating said fluid in said first tube portion.

4,955,324

PULSE COMBUSTION UNIT FOR LIQUID HEATING APPARATUS

Susumu Ejiri, Toyoake, Japan, assignor to Paloma Kogyo Kabushiki Kaisha, Aichi, Japan

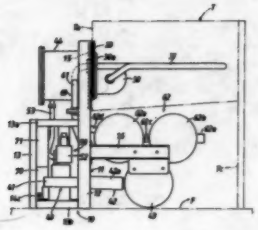
Filed Jan. 10, 1990, Ser. No. 463,330
Claims priority, application Japan, Jan. 11, 1989, 1-4298
Int. Cl.[5] F22B *37/24*
U.S. Cl. 122—510 **3 Claims**

1. A pulse combustion unit for a liquid heating apparatus having a liquid vessel arranged to store an amount of liquid to be heated, comprising:
an upright support structure mounted on a floor;
a base plate mounted to an upper portion of said support structure;
a pulse combustion burner assembly including a pulse combustion chamber secured to one surface of said base plate and a curved tailpipe having an inner end connected to an exhaust port of said combustion chamber and outer end connected to said base plate;
an air-fuel mixer head secured to the other surface of said base plate and being in open communication with the

interior of said combustion chamber through a central opening of said base plate;

an air supply part mounted within a lower portion of said support structure, said air supply part including an air intake pipe in communication with said mixer head for supplying fresh air into said mixer head;

a fuel supply part mounted within the lower portion of said support structure adjacent said air supply part, said fuel supply part including a fuel supply conduit in communication with said mixer head for supplying gaseous fuel into said mixer head; and



an exhaust part mounted on said support structure at a position located below said combustion chamber, said exhaust part including an exhaust pipe connected to the outer end of said tailpipe to exhaust combustion products from said tailpipe,

wherein said liquid vessel is coupled at a side wall thereof with said base plate in such a manner that said combustion chamber and tailpipe are arranged in said vessel.

4,955,325

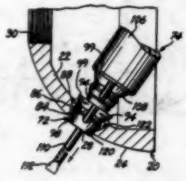
ACETABULAR CUP COMPONENT CEMENT SPACER SYSTEM

Alfred J. Zarnowski, North Plainfield, and Robert C. Cohen, Rockaway Township, Morris County, both of N.J., assignors to Osteonics Corp., Allendale, N.J.

Filed Jun. 14, 1989, Ser. No. 365,791

Int. Cl.[5] A61F 2/34

U.S. Cl. 623—22 **9 Claims**



1. A cement spacer system for use in combination with an acetabular cup component of the type which includes a shell-like wall having a given wall thickness and an outer affixation surface adapted for direct affixation of the acetabular cup component to the acetabulum and apertures passing through the wall at spaced locations along the outer affixation surface, each aperture defining an inner rim of predetermined inside diameter, for enabling selective interoperative conversion of the acetabular cup component for cemented affixation of the acetabular cup component to the acetabulum, the cement spacer system comprising:

a plurality of cement spacers, each cement spacer including a bore extending axially therethrough, and a spacer head having an axial spacing length, and confronting locking shoulders adjacent the spacer head and having an overall diameter greater than the inside diameter of the rim of a respective aperture in the wall of the acetabular cup component, a generally annular groove essentially complementary to the inside diameter of the rim of the corresponding aperture and interposed between the confronting locking shoulders, and resilient deflection means for enabling lateral resilient deflection of the locking shoulders to admit the rim of the corresponding aperture between the confronting locking shoulders in response to axial insertion of the cement spacer into the respective aperture; and

a spacer inserted for use in the selective insertion of the cement spacers into the wall of the acetabular cup component, the spacer inserter including a gripping handle, a locator rod extending axially form the handle and having a rod diameter complementary to the axial bore of each cement spacer such that the cement spacers may be disposed along the locator rod, a lateral pushing surface interposed between the handle and the locator rod and adapted for engaging the confronting adjacent cement spacer disposed along the locator rod whereby axial pushing of the handle transmit axial force to the cement spacers disposed along the locator rod, allowing selective insertion and securement of each cement spacer within a corresponding aperture in the wall of the acetabular cup component.

4,955,326

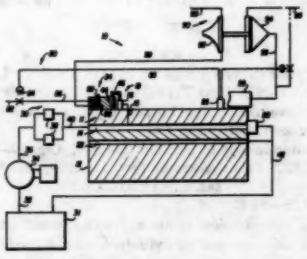
LOW EMISSION DUAL FUEL ENGINE AND METHOD OF OPERATING SAME

Melvin J. Helmich, Grove City, Pa., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 12, 1989, Ser. No. 336,789

Int. Cl.[5] F02B 3/00

U.S. Cl. 123—27 GE **26 Claims**



1. A low emission duel fuel engine system comprising:

a dual fuel engine having a combustion chamber;

a fuel oil supply connected to said engine;

a fuel gas supply connected to said engine; and

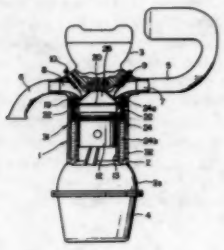
means connected between said fuel oil supply and said engine for injecting fuel oil into said engine, said means connected between said engine and fuel oil supply limiting the injection of fuel oil to the combustion chamber to pilot ignition quantities only, wherein said limiting means includes means for limiting the injection of fuel oil such that the exhaust emission of NOx is at an emission rate of less than 1 GM/PH-HR, whereby the exhaust emission performance of the dual fuel engine is enhanced.

4,955,327

PARTIAL-BOIL COOLING APPARATUS FOR ENGINE

Taizo Kitada, Okazaki; Takehiko Katsumoto; Osamu Hirako, both of Kyoto; Masatoshi Ninoyu, Okazaki; Yasuyuki Makigawa, Amagasaki; Gorou Yamanaka, Amagasaki, and Masao Fujii, Amagasaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,393
Claims priority, application Japan, Oct. 17, 1988, 63-261045
Int. Cl.[5] F01P *3/00*
U.S. Cl. 123—41.42 4 Claims



1. A partial-boil cooling apparatus for an engine, comprising:

a water jacket including (i) a forcible circulation part located chiefly round a cylinder head of the engine for forcibly circulating a cooling water in said water jacket by a water pump, and (ii) a natural convection part located chiefly round a liner of a cylinder block of the engine for allowing a combined coolant composed of said cooling water and a cooling medium different therefrom in said natural convection part to move by natural convection with restraining said coolant from forcible circulation by said water pump; and

said natural convection part being filled at its upper space with said cooling water and at its lower space with said cooling medium having a boiling point around a temperature zone to cool said liner, said cooling medium having a specific gravity larger than that of said cooling water and immiscible with antipathic to said cooling water.

4,955,328

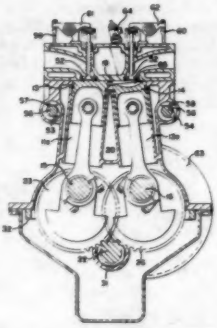
LEADING PISTON ENGINE WITH TWO CYLINDERS INTERCONNECTED THROUGH A TRANSFER PORT

Rafal A. Sobotowski, Bay Village, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 234,561, Aug. 19, 1988, Pat. No. 4,876,922. This application Oct. 31, 1989, Ser. No. 429,700
Int. Cl.[5] F02B *25/08*
U.S. Cl. 123—51 R 1 Claim

1. In a compression ignition internal combustion engine having at least one pair of cylinders, said at least one pair of cylinders consisting of a leading cylinder and a trailing cylinder, a leading piston operating in the leading cylinder and a trailing piston operating in the trailing cylinder, the leading cylinder interconnected with the trailing cylinder through a transfer port to permit the transfer of gases therebetween irrespective of the axial position of pistons operating therein, the cross-sectional area of said transfer port being substantially smaller than the cross-sectional area of either cylinder interconnected thereby, means to control the phase relation between the leading piston and the trailing piston for the purpose of varying compression ratio, fuel injection into the leading cylinder by means of a multi-hole fuel injector situated in a generally central position in said leading cylinder, the clearance volume of the trailing cylinder at the top dead center position of the trialing piston being at a practical minimum value, characterized by:

a combustion bowl in the leading cylinder;



said leading piston having a top surface;

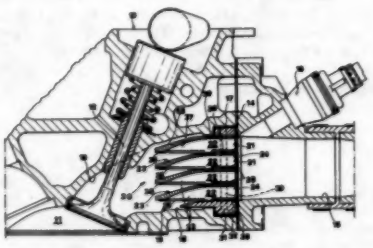
said combustion bowl in the leading cylinder extending over substantially the whole top surface of said leading piston.

4,955,329

VALVE UNIT FOR AN INTERNAL COMBUSTION ENGINE INTAKE DUCT, COMPRISING NON-RETURN FLAP VALVES

Domenico D'Angelo, Monza, and Marco Visconti, Bollate, both of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy

Filed Mar. 10, 1989, Ser. No. 321,868
Claims priority, application Italy, Mar. 14, 1988, 19766 A/88
Int. Cl.[5] F02M *35/00*
U.S. Cl. 123—52 MF 5 Claims



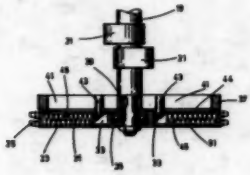
1. A valve unit for an intake duct feeding an internal combustion engine cylinder, said valve unit comprising a plurality of longitudinal channels assembled into superposed modules, each channel having a substantially arcuate base wall and an elastically flexible flap for the purpose of opening and closing a respective channel whereby said valve unit consists of non-return valve means in series with an intake valve of the internal combustion engine, each channel having an inlet section and an outlet section, the inlet section comprising a ledge and a support surface which are clamped with a fixing tab when the modules are formed, each fixing tab being provided on one of said flaps, each base wall having an increasing thickness extending towards the outlet section of the respective channel, each base wall having an inner face and an outer face, the inner and outer faces each having a bending radius, the inner face having a different bending radius than the bending radius of the outer face thereby providing a gradual slight reduction of the respective chamber towards the outlet section of the respective chamber, each base wall being provided with a slot, each slot

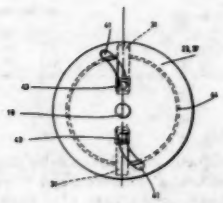
housing a tight sealing gasket material, and each slot extending through a portion of the base wall.

4,955,330
CAM DRIVE MECHANISM FOR INTERNAL COMBUSTION ENGINE

Christian Fabi, and Antoine Fabi, both of 209 Belvedere Nord, Sherbrooke, Quebec, Canada J1H 4A7

Filed Dec. 20, 1989, Ser. No. 454,725
Claims priority, application Canada, Dec. 28, 1988, 587071
Int. Cl.[5] F01L *1/34*; F02P *5/00*
U.S. Cl. 123—90.17 9 Claims





1. A mechanism for use in an internal combustion engine comprising a crank shaft and at least one cam shaft, said mechanism being designed to progressively vary the angular relationship of said at least one cam shaft relative to said crank shaft, and comprising

a first disk provided with two radially extending cavities aligned with respect to each other, each of said cavities containing a spring-biased small weight slidably mounted therein, said spring urging said small weight towards the center of said first disk;

means for connecting said first disk to said crank shaft to cause said first disk to be driven by said crank shaft;

a second disk coaxially mounted with respect to said first disk, said second disk being provided with two arcuated slots of identical curvatures, said slots being symmetrical with respect to the center of said second disk and extending from a short distance away from said center towards the periphery of said second disk in opposite directions;

means for connecting said second disk to said at least one cam shaft to cause said cam shaft to rotate at the same speed as said second disk; and

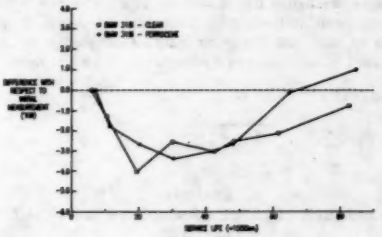
connecting pins integral with said small weights, said pins being engaged into the arcuated slots and free to move therein so as to drive into rotation said second disk when the first disk rotates;

wherein, when the rotation speed of the crank shaft varies, the small weights radially sliding in the cavities of the first disk under the action of the centrifugal force, and cause the pins connected thereto to move along the arcuated slots of the second disk and thus to progressively vary the angular relationship of the second disk with respect to the first disk.

4,955,331
PROCESS FOR THE OPERATION OF AN OTTO ENGINE

Dieter Hohr, Wesel; August-Wilhelm Preuss; Kurt-Peter Schug, both of Dorsten, and Helmut Riegel, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Veba Oel Aktiengesellschaft, Gelsenkirchen, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,129
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801947
Int. Cl.[5] F02B *75/12*; C10L *10/00*
U.S. Cl. 123—1 A 6 Claims



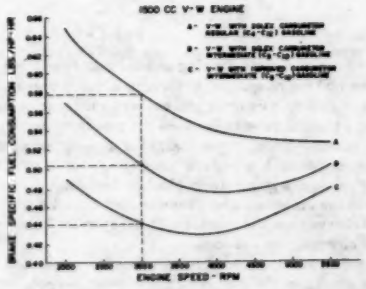
1. A method for operating an engine, comprising:

operating an Otto engine equipped with an exhaust gas catalyst system for secondary combustion of exhaust gas, with a non-leaded liquid fuel containing 1 to 100 ppm by weight of ferrocene.

4,955,332
METHOD OF IMPROVING FUEL COMBUSTION EFFICIENCY

William L. Talbert, York, Pa., assignor to Talbert Fuel Systems, Inc., Allentown, Pa.

Division of Ser. No. 236,162, Aug. 25, 1988, Continuation-in-part of Ser. No. 941,833, Dec. 15, 1986, abandoned, which is a continuation of Ser. No. 833,038, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 638,069, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 463,251, Feb. 2, 1983, abandoned, which is a continuation of Ser. No. 70,683, Aug. 29, 1979, abandoned. This application May 5, 1989, Ser. No. 347,753
Int. Cl.[5] F02B *75/12*
U.S. Cl. 123—1 A 12 Claims



1. A method of operating an internal combustion engine which comprises vaporizing a gasoline-alcohol fuel mixture by heating it in a chamber to above the final boiling point of the gasoline at one atmosphere pressure in the absence of air to form a vaporized gasoline-alcohol fuel mixture and immediately mixing the vaporized gasoline-alcohol fuel mixture with

air in a carburetor without forming liquid droplets in the mixture and then immediately combusting the mixture in the engine in substantially a vaporized state; said gasoline comprising a mixture of hydrocarbons; said mixture having an intermediate carbon range relative to C_4–C_{12} fuel; said intermediate carbon range consisting essentially of the hydrocarbons in the range of C_6–C_{10} with C_9 and C_{10} hydrocarbons being present in the gasoline; said gasoline having a boiling point range between 121° F. and about 345° F. at 1 atmosphere pressure and said gasoline being capable of being vaporized by heating in a chamber to a temperature above the final boiling point of the gasoline at one atmosphere pressure and said vapor capable of being immediately mixed with air in a carburetor without the substantial instantaneous formation of liquid droplets therein so that said vapor/air mixture can be immediately combusted in the engine in a completely vaporized form.

4,955,333

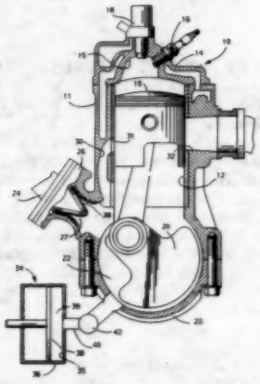
VARIABLE VOLUME CRANKCASE SCAVENGE CONTROL

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,222

Int. Cl.[5] F02B *33/04*

U.S. Cl. 123—73 AC **1 Claim**



1. A two cycle engine having at least one cylinder with a piston carried for reciprocation therein, a closed crankcase at one end of each said cylinder and having a charge inlet, means defining a transfer passage between the crankcase and a distal portion of the cylinder, crank means for moving the piston in the cylinder between upper and lower positions in which the transfer passage is respectively blocked for compression of a charge in the crankcase and unblocked for transfer of a compressed charge from the crankcase to the cylinder for scavenging and charging the cylinder,

a supplemental chamber having a portion connected with the crankcase for increasing the volume thereof,

adjustable means in the supplemental chamber for varying the volume of the supplemental chamber portion connected with the crankcase to vary the effective volume of the crankcase, and the improvement comprising

a control valve between each crankcase chamber and its respective supplemental chamber and operable to cut off or permit flow therebetween.

4,955,334

CONTROL APPARATUS FOR VALVE DRIVEN BY ELECTROMAGNETIC FORCE

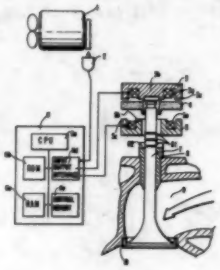
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Dec. 22, 1989, Ser. No. 454,959

Claims priority, application Japan, Dec. 28, 1988, 63-334969

Int. Cl.[5] F01L *9/04*

U.S. Cl. 123—90.11 **5 Claims**



1. An electromagnetic force-driven valve control apparatus for opening and closing a suction/exhaust valve upon sensing rotational speed and rotational phase of an engine output shaft, comprising:

sensing means for sensing position of the valve controlled to move up and down at a predetermined speed, and for sensing amount of bounce of the valve when the valve is seated;

drive control means for applying, based on the amount of bounce of the valve, a driving force in a seating direction immediately after seating;

memory mean for storing the driving force applied by said drive control means; and

arithmetic means for deciding, in accordance with the driving force stored in said memory, a force acting in a valve lifting direction until immediately before the valve is seated, and a force immediately after the valve is seated.

4,955,335

CAMSHAFT DRIVING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINE

Nobuhisa Jingu, Yokohama City, and Yoshio Iwasa, Nagareyama City, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Dec. 14, 1989, Ser. No. 450,777

Claims priority, application Japan, Dec. 22, 1988, 63-166443[U]

Int. Cl.[5] F01M *9/10*

U.S. Cl. 123—90.31 **6 Claims**

1. In an internal combustion engine:

a cylinder block including a cylinder bank;

a cylinder head mounted on said cylinder bank and having an end face, said cylinder head being formed with a cam chamber;

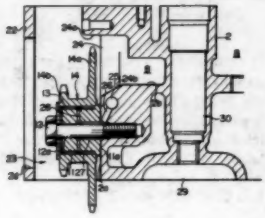
an oil pan storing a lubrication oil;

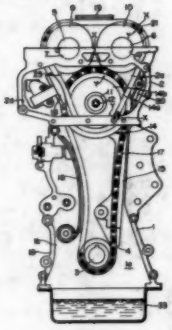
said cylinder head being formed with an idler chamber communicating with said oil pan and wall means defining

said idler chamber, said wall means including said end face;

said end face including a predetermined portion formed with at least one opening allowing communication between said cam chamber and said idler chamber;

an idler shank fixedly mounted on the cylinder head and projecting out of said end face into said idler chamber;





an idler sprocket rotatably supported on said idler shank and disposed in said idler chamber, said idler sprocket including a radial portion disposed adjacent said end face and extending in the vicinity of said predetermined portion;

said end face of said cylinder head, said radial portion of said idler sprocket, and said idler shank cooperating with each other to define a passage allowing oil flowing out of said cam chamber via said opening to flow therethrough down toward said oil pan.

4,955,336

CIRCUIT FOR DETERMINING THE CRANK POSITION OF AN IGNITION SWITCH BY SENSING THE VOLTAGE ACROSS THE STARTER RELAY CONTROL AND HOLDING AN ELECTRONIC DEVICE IN A RESET CONDITION IN RESPONSE THERETO

Thomas, Macomb County Glowczewski, Washington Township, and Keith B. Carle, Hartland, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 188,614
Int. Cl.[5] F02N *11/08*
U.S. Cl. 123—179 B **4 Claims**

1. In an electronic controller, with electronic devices, for a prime mover, the prime mover including an internal combustion engine, a supply voltage, ignition means, an ignition switch at least with S2 contacts and NS_1 contacts, a starter and a relay coil for the starter, a circuit for the sensing of the crank position of the ignition switch comprising:

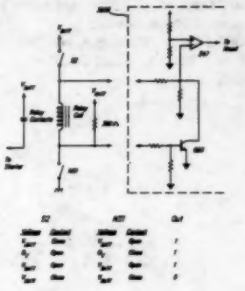
the relay coil for the starter being connected between the S2 contacts and the NS_1 contacts;

the S2 contacts connected between the relay coil and the supply voltage;

the NS_1 contacts connected between the relay coil and ground;

the high side of the NS_1 contacts being pulled up to a supply voltage;

an inverter with a (+) and a (−) input, the output of the inverter configured to control the reset of an electronic device;



the S2 contact side of the relay coil fed into the (−) input of the inverter;

transistor means;

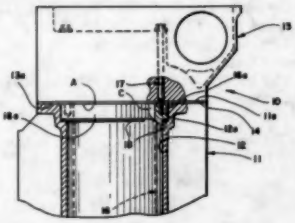
the NS_1 contact side of the relay coil fed into the (−) input of the inverter through the transistor means such that the output of the inverter will indicate when the ignition switch is in the crank position.

4,955,337

HIGH COMPRESSION INTERNAL COMBUSTION ENGINE

Eudell L. Kelly, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Dec. 18, 1989, Ser. No. 455,493
Int. Cl.[5] F02F *1/00*
U.S. Cl. 123—193 CH **9 Claims**



1. A high compression internal combustion engine comprising an engine block having at least one cylinder bore formed therein, said bore having one end terminating at an exterior surface of said block; a cylinder liner disposed within the bore and having an end thereof proximate said block exterior surface; a cylinder head overlying said block exterior surface, said head having an exterior surface complementary to and in registry with said block surface; gasket means interposed between said complementary exterior surfaces; first fastening means engaging said head and the one end of said cylinder liner and securing in sealed relation said one end of said liner to said head surface upon a first predetermined external tightening force being applied to said first fastening means; and second fastening means engaging said head and said block and secur-

ing in sealed relation said complementary exterior surfaces together upon a second predetermined external tightening force being applied to said second fastening means.

4,955,338

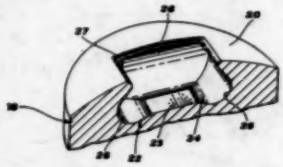
ENGINE AND HIGH TURBULENCE PISTON THEREFOR

Ramachandra Diwakar, Sterling Heights; Roger B. Krieger, Birmingham; Keith Meintjes, Grosse Pointe Farms, and Edward G. Groff, Troy, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 16, 1988, Ser. No. 208,301

Int. Cl.[5] F02B *23/06*

U.S. Cl. 123—276 **9 Claims**



1. An internal combustion engine comprising

a cylinder closed at one end,

a piston reciprocable in the cylinder and having a head end opposing the cylinder closed end, the piston defining with the cylinder a variable volume working chamber, said piston having a reentrant polygon shaped combustion chamber bowl having a bottom with an outer portion that joins with essentially U-shaped side walls smoothly and exclusively connecting the bottom of the polygonal bowl with a polygonal lip located in the head end and defining an opening toward the cylinder closed end, and

direct fuel injection means mounted in the cylinder closed end opposite the combustion chamber bowl and adapted to direct a fuel spray into the open combustion chamber.

4,955,339

INTERNAL COMBUSTION ENGINE

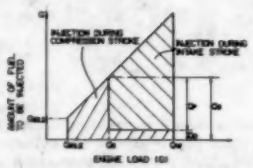
Shizuo Sasaki, Susono, and Yoshiyuki Tamaki, Mishima, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Nov. 17, 1989, Ser. No. 438,698

Claims priority, application Japan, Nov. 18, 1988, 63-290200; Dec. 23, 1988, 63-323604

Int. Cl.[5] F02B *17/00*; F02D *4/40*; F02M *51/00*

U.S. Cl. 123—295 **31 Claims**



1. An internal combustion engine having a piston introduced into a cylinder and a spark plug arranged in a cylinder head, said engine comprising:

a fuel injector for injecting fuel directly into the cylinder;

detecting means for detecting an engine operating state;

calculating means for calculating a calculated amount of fuel to be injected on the basis of said engine operating state detected by said detecting means; and

a control means for controlling said fuel injector to inject all of said calculated amount of fuel during a compression stroke when said calculated amount of fuel is smaller than a predetermined first amount of fuel, inject a part of said calculated amount of fuel during approximately a first half of an intake stroke, and inject a remaining part of said calculated amount of fuel during a compression stroke when said calculated amount of fuel is equal to or larger than said predetermined first amount of fuel and smaller than a predetermined second amount of fuel which is larger than said predetermined first amount of fuel.

4,955,340

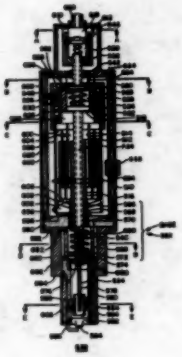
ELECTRONIC CONTROLLER FOR COMPRESSION-ACTUATED FUEL INJECTOR SYSTEM

George D. Elliott, 14902 Clovercrest Dr., Huntsville, Ala. 35803

Continuation-in-part of Ser. No. 104,847, Oct. 5, 1987, Pat. No. 4,911,123, which is a continuation-in-part of Ser. No. 904,378, Sep. 8, 1986, Pat. No. 4,700,678. This application Mar. 28, 1989, Ser. No. 329,519

Int. Cl.[5] F02M *49/02*; F02D *41/04*

U.S. Cl. 123—297 **16 Claims**



1. In an internal combustion type engine having engine piston means and a combustion chamber and a fuel injector with said fuel injector comprising:

a first outer shell containing a fuel supply cavity positioned at the top end of said fuel injector and having an inner high pressure cavity with a valve for receiving and storing fuel;

a rod having one end thereof closed and with a first port extending through the side of the rod near its closed end and extending substantially from said fuel supply cavity along the entire length thereof and having a piston formed thereon and with an internal bore therethrough for carrying fuel from said fuel supply cavity to said combustion chamber in response to the state of the engine piston stroke and the pressure generated thereby in the engine piston combustion chamber;

a base for supporting said rod in said fuel injector and responsive to a pressure increase in said combustion chamber to cause said rod to rise within said first outer shell and into said fuel supply cavity, to close said valve to prevent further fuel from entering said fuel supply cavity and to expose said first port to said fuel supply cavity to receive fuel and, by virtue of the force created by said rod further entering said fuel supply cavity, forcing said fuel down said bore and into said combustion chamber;

a movable control body assembly positioned under said fuel supply cavity;

a plurality of substantially concentric and open ended cylinders with alternate open ended cylinders being secured at a first end in the bottom of said control body assembly and

the first ends of the other open ended cylinders being secured to said base;

means for supplying a voltage to selected open ended cylinders at predeterminable time intervals; and

an electro-rheological mixture filling that portion of said fuel injector between said fuel supply cavity and said base and responsive to said voltage being supplied to selected open ended cylinders to become solidified in between adjacent open ended cylinders and said rod only;

said control body assembly comprising:

a second outer shell with a second port therein and positioned within said first outer shell below said fuel supply cavity and supported above said concentric open ended cylinders by selected open ended cylinders and positioned concentrically around a given portion of said rod including said piston; and further comprising electro-rheological mixture flow control means for controlling the flow of electro-rheological fluid within said control body assembly and between the inside of said control body assembly and the space between said control body assembly and said outer shell in response to the movement of the piston in said control body assembly;

said electro-rheological mixture flow control means comprising:

an immovable first cylindrical wall engageably surrounding said piston to form a piston cavity thereabove and having a third port positioned at the top thereof;

a second movable cylindrical wall surrounding and slidably engaging said first cylindrical wall and having a fourth port therein normally aligned with said third port; and

a ring surrounding and slidably engaging said second cylindrical wall in a first position to cover said second port in said second outer shell when said electro-rheological mixture is in fluid form and the pressure in said combustion chamber and said piston cavity is low, and in a second position when the combustion chamber pressure is high and said electro-rheological mixture is fluid to align said second, third, and fourth ports to allow free flow from said piston cavity to the space between said control body assembly and said first outer shell when said piston is moving towards and into said fuel supply cavity and said piston cavity pressure is high;

said control body assembly, including only said second outer shell and said second cylindrical wall responsive to the solidification of said electro-rheological mixture to move with respect to said first cylindrical wall to misalign said third port from said fourth port to seal said piston cavity, thus preventing said piston from further motion into said first cylindrical wall and thereby removing the pressure in said fuel supply cavity and stopping the flow of fuel to said combustion chamber through said rod bore.

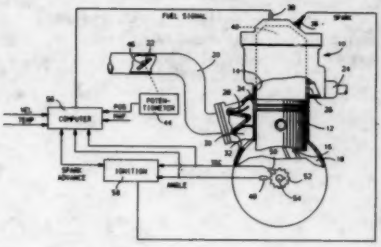
4,955,341

IDLE CONTROL SYSTEM FOR A CRANKCASE SCAVENGED TWO-STROKE ENGINE

Douglas E. Trombley, Warren, and Kenneth J. Buslepp, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 18, 1989, Ser. No. 408,868
Int. Cl.[5] F02M *3/00*; F02B *33/04*
U.S. Cl. 123—339 **14 Claims**

1. In a direct cylinder fuel injected, scavenged two-stroke engine, the improvement comprising means for controlling the idle speed of the engine by regulating the timing of the start of cylinder fuel injection during the engine cycle, as a function of the difference between the actual idle speed and a desired target idle speed, so that a relatively large and nearly instantaneous change in engine output torque and associated idle speed



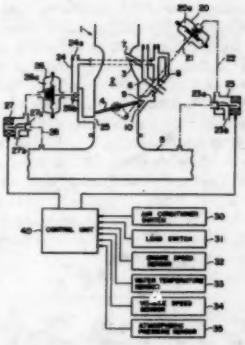
can be achieved in response to a relatively small change in cylinder fuel injection timing.

4,955,342

IDLE REVOLUTION NUMBER CONTROL APPARATUS FOR CARBURETER

Masato Tohmiya, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1989, Ser. No. 421,054
Claims priority, application Japan, Oct. 19, 1988, 63-263355
Int. Cl.[5] F02M *3/07*
U.S. Cl. 123—339 **5 Claims**



1. An idling engine speed control apparatus for an engine with a carbureter having a main fuel passage for supplying fuel to the engine and a slow fuel passage for supplying fuel to the engine in accordance with an opening degree of a throttle valve mounted within the carbureter comprising:

throttle opener means for opening said throttle valve to a predetermined opening degree;

bypass means for selectively supplying fuel to the downstream of said throttle valve;

load detector means for detecting a plurality of load conditions of said engine and producing load signals;

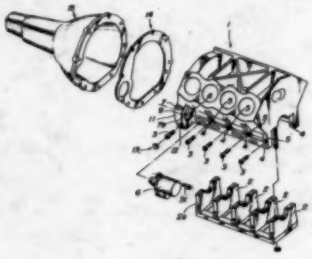
engine operating condition detector means for detecting an engine operating condition and producing an engine operating condition signal; and

control means responsive to the load signals and to the engine operating condition signal for determining an idling condition and for actuating one or both of said throttle opener means and bypass means.

4,955,343
CYLINDER BLOCK

Etsuo Ogami, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 14, 1989, Ser. No. 450,699
Claims priority, application Japan, Dec. 24, 1988, 63-167146[U]
Int. Cl.[5] F02F 7/00
U.S. Cl. 123—195 R **9 Claims**



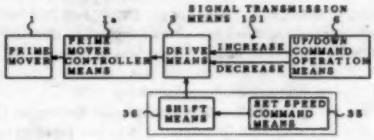
1. In an internal combustion engine:
a cylinder block having a predetermined end surface;
a plurality of main bearing caps including a predetermined main bearing cap, said plurality of main bearing caps being secured to said cylinder block at a plurality of portions including a predetermined portion, said predetermined main bearing cap being secured to said cylinder block at said predetermined portion;
a flange integral with said cylinder block, said flange having first and second end walls extending from said cylinder block and spaced from each other, and a peripheral wall which interconnects said first and second end walls, said first, second and peripheral walls cooperating with said predetermined portion of said cylinder block to define a chamber, said first end wall being disposed adjacent said predetermined end surface of said cylinder block, said second end wall being disposed less adjacent said predetermined end surface of said cylinder block,
said peripheral wall being formed with an opening communicating with said chamber, said opening and said chamber serving as an access to said predetermined portion;
means for closing said opening;
a starter motor mounted on said flange.

4,955,344
APPARATUS FOR CONTROLLING ROTATIONAL SPEED OF PRIME MOVER OF CONSTRUCTION MACHINE

Akira Tatsumi, Chiba; Toichi Hirata, Ibaragi; Masaki Egashira, Ibaragi; Osamu Tomikawa, Ibaragi, and Hiroshi Watanabe, Ibaragi, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Jul. 3, 1989, Ser. No. 374,836
Claims priority, application Japan, Jul. 4, 1988, 63-166317
Int. Cl.[5] F02M 39/00
U.S. Cl. 123—352 **33 Claims**

1. An apparatus for controlling the rotational speed of a prime mover of a construction machine, comprising:
prime mover controller means for controlling the rotational speed of the prime mover;
drive means for driving said prime mover controller means;
up/down command operation means operated between an up position at which it outputs an up signal for increasing the rotational speed of the prime mover and a down position at which it outputs a down signal for reducing the rotational speed of the prime mover; and
signal transmission means for supplying a drive signal to said drive means whereby the prime mover rotational speed is

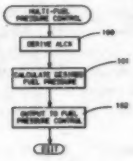


increased on the basis of said up signal and is reduced on the basis of said down signal.

4,955,345
MULTI-FUEL ENGINE CONTROL WITH FUEL COMPOSITION RESPONSIVE FUEL VISCOSITY CORRECTION

David B. Brown, and Eugene V. Gonze, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 367,155, Jun. 16, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 453,120
Int. Cl.[5] F02D 7/00
U.S. Cl. 123—381 **9 Claims**



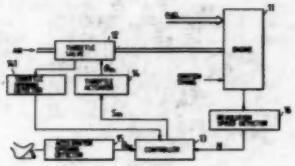
1. A vehicle engine fuel control comprising a fuel conduit, means for providing a liquid fuel mixture of first and second combustible fuels, having different volumetric heat contents and viscosities, through the fuel conduit at a predetermined pressure, a fuel composition sensor in the fuel conduit responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second combustible fuels, and fuel injection apparatus comprising a fuel injector in the conduit and control means for opening the fuel injector for predetermined pulse durations to deliver pulses of fuel to the engine, the fuel injection apparatus determining the pulse durations in response to the fuel composition signal for a predetermined amount of fuel calibrated for flow characteristics of the injector and the viscosity of the first fuel,
the fuel injection apparatus being further responsive to the fuel composition signal to vary the predetermined pulse durations in compensation for the varying viscosity of the fuel mixture so as to provide the predetermined amounts of fuel in the fuel pulses as the viscosity of the fuel mixture varies with the composition thereof.

4,955,346

THROTTLE CONTROL APPARATUS OF INTERNAL COMBUSTION ENGINE

Masayoshi Kaneyasu, Hitachi, and Nobuo Kurihara, Hitachi-oota, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 1, 1989, Ser. No. 360,237
Claims priority, application Japan, Jun. 3, 1988, 63-135605
Int. Cl.[5] F02D 11/10
U.S. Cl. 123—399 12 Claims



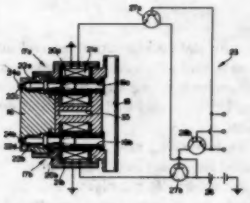
1. A throttle control apparatus of an internal combustion engine including an accelerator opening detector for detecting an accelerator depression, an engine revolution speed detector, a throttle actuating means for actuating a throttle valve and a control unit for outputting a driving signal for driving said throttle actuating means, wherein said control unit comprises a device for determining a throttle opening on the basis of an accelerator depression amount from said accelerator opening, an accelerator depression speed and the engine revolution speed from said engine revolution speed detector and for outputting a driving signal for the determined throttle opening to said throttle actuating means, wherein said driving signal outputted by said control unit actuates said throttle actuating means to rapidly operate said throttle valve upon a rapid change of an accelerator depression to a throttle opening more than that determined according to an accelerator depression quantity thereby to obtain desired longitudinal acceleration, and to open said throttle valve to a slightly larger opening than that determined according to the acceleration depression quantity after completion of the throttle operation for the desired longitudinal acceleration and after a certain time lapsed from the starting of the rapid change in the accelerator depression, whereby longitudinal vibration due to the desired acceleration is eliminated.

4,955,347

FUEL INJECTOR ASSEMBLY FOR FUEL-INJECTED ENGINE

Yasuhiro Toyoda, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 337,012
Claims priority, application Japan, Apr. 12, 1988, 63-89726
Int. Cl.[5] F02M 39/00
U.S. Cl. 123—472 3 Claims



1. A fuel injection assembly in an engine having a plurality of cylinders and intake passages opening respectively to the cylinders, comprising:

a single injection body mounted in each of said intake passages;

a pair of solenoid-operated fuel injection valve means connected to a fuel supply source for injecting fuel through the intake passage into each of the cylinders; and

said pair of solenoid-operated fuel injection valve means being accommodated in said injection body and each having a hole defined in said injection body, a needle valve axially movably disposed in said hole, and a solenoid for axially moving said needle valve in said hole,

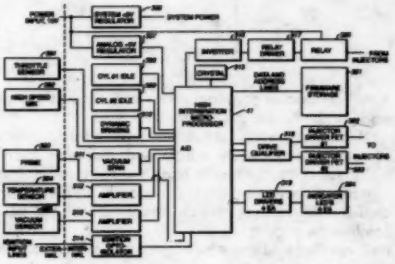
said single injection body having a magnetic shield layer between said fuel injection valve means, said magnetic shield layer having a width not less than the width of said solenoids.

4,955,348

FUEL INJECTION CONVERSION SYSTEM FOR V-TWIN MOTORCYCLE ENGINES

William A. Budde, 1128 Gilbert St., Hayward, Calif. 94541, and Floyd Khapp, Mountain View, Calif., assignors to William A. Budde, Hayward, Calif.

Filed Nov. 8, 1989, Ser. No. 434,436
Int. Cl.[5] F02D 41/24, 41/02
U.S. Cl. 123—478 13 Claims



1. A fuel injection conversion system for V-twin motorcycle engines having two cylinders, an ignition system, and a fuel source, comprising

an intake manifold providing separate ducts for delivering a fuel and air mixture separately to each cylinder,

a pair of fuel injectors mounted in a fuel injector and throttle body secured to said intake manifold,

a fuel distributor for delivering an individual pressurized fuel flow to each of said injectors,

a fuel pump for delivering a pressurized fuel flow from the fuel source to the fuel distributor,

a fuel flow pressure regulator for controlling the pressure of the fuel flow delivered by the distributor to said injectors,

an electronic sensing means for determining when the ignition system of the engine delivers an electronic pulse to fire each spark plug of the cylinders and producing an electronic signal in response thereto,

a throttle potentiometer for sensing the position of the throttle and producing an electronic signal in response thereto,

a status sensing means for measuring a combination of air intake and engine temperature, and vacuum in the intake manifold and producing electronic signals therefrom, and

a control unit which discriminates which spark plug of the engine is firing a fuel-air mixture charged cylinder of the engine from the asymmetrical spark plug firing order related electronic signal from said electronic sensing means, said control unit electronically integrating the electronic signals from the throttle potentiometer, the electronic sensing means, and the status sensing means to generate electronic signals which control the fuel injectors and operate them at the proper time and for the

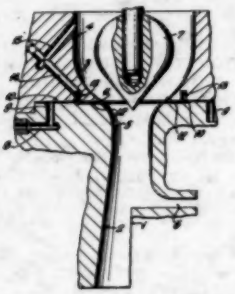
calculated duration to deliver the proper amount of fuel to said cylinders for the engine operating conditions by timed injection.

4,955,349

DEVICE FOR PREPARATION OF A FUEL-AIR MIXTURE FOR INTERNAL COMBUSTION ENGINES

Martin Feldinger, Königstein, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,313
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—531 **7 Claims**



1. A fuel-air mixture preparation device for internal combustion engines, the device comprising

a nozzle body of rotational symmetry and a throttle element of rotational symmetry which is displaceably mounted within the body, the nozzle body and the throttle element forming a convergent-divergent nozzle which is configured for debouching into an intake tube of the internal combustion engine;

at least one fuel feed line which opens into said nozzle alongside the narrowest nozzle cross section;

a fuel-air slot which circumscribes said convergent-divergent nozzle and has a slot opening encircling said nozzle, the fuel-air slot opening into the nozzle;

a fuel slot and an air feed which are disposed in said nozzle body circumferentially around said nozzle to define a transition point in said nozzle, said air-fuel slot being in communication at the transition point with said circumferential fuel slot and said circumferential air feed, said fuel-air slot extending radially with uniform thickness from said slot opening to said transition point, there being approximately ambient air pressure at said air feed to enable fuel premixed with air to be injected from said fuel-air slot opening into said nozzle approximately transversely to the direction of main air mass flow; and

an annular fuel channel disposed in said nozzle body in front of said fuel-air slot, said fuel-air slot cooperating with said fuel channel to form said throttle element as a laminar throttle.

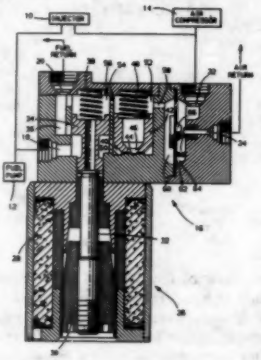
4,955,350

FUEL INJECTION

William C. Albertson, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,503
Int. Cl.[5] F02M *67/02*; G05D *16/20*
U.S. Cl. 123—533 **1 Claim**

1. A pressure regulator comprising a body having a fuel inlet, a fuel outlet, an air inlet, an air outlet, a spill passage connecting the fuel inlet to the fuel outlet, a spool valve controlling flow through the spill passage, a linear motor having a coil and an armature, a stem connecting the armature to the valve to position the valve to control flow through the spill passage and thereby to control the fuel pressure in the inlet as a function of the current in the coil, a piston subjected to the pressure in the fuel inlet, the piston defining a variable orifice adapted to create a reference pressure at a desired differential from the pressure in the fuel inlet, a diaphragm subjected to the



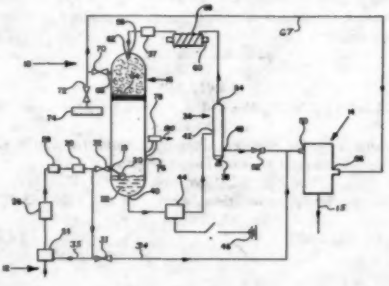
reference pressure and the pressure in the air inlet, and a valve positioned by the diaphragm to control flow from the air inlet to the air outlet whereby the pressure in the air inlet is maintained at a desired differential below the pressure in the fuel inlet.

4,955,351

VAPOR-ACCELERATED COMBUSTION FUEL SYSTEM

Alfred M. Lewis, 3541 Delgany Dr., Charlotte, N.C. 28215, and James W. Cox, 309 Cooper St., Asheboro, N.C. 27204

Filed Feb. 2, 1989, Ser. No. 305,956
Int. Cl.[5] F02M *31/02*
U.S. Cl. 123—557 **17 Claims**



1. Apparatus for delivering vaporized and unvaporized fuel from a fuel source into a fuel delivery mechanism, comprising:

(a) a container for holding vaporized and unvaporized fuel positioned between said fuel source and said fuel delivery mechanism;

(b) means for furnishing said container with a reservoir of unvaporized fuel from said fuel source;

(c) means for externally supplying said container and said fuel delivery mechanism, concurrently, with heated unvaporized fuel and unheated unvaporized fuel, respectively, drawn from said reservoir;

(d) means for vaporizing heated unvaporized fuel within said container; and

(e) means for providing said fuel delivery mechanism with vaporized fuel from said container.

17. Method for delivering vaporized and unvaporized fuel from a fuel source into a fuel delivery mechanism, comprising:

(a) holding vaporized and unvaporized fuel within a container positioned between said fuel source and said fuel delivery mechanism;

(b) furnishing said container from said fuel source with a reservoir of unvaporized fuel;

(c) externally supplying said container and said fuel delivery mechanism, concurrently, with heated unvaporized fuel and unheated unvaporized fuel, respectively, drawn from said reservoir;

(d) vaporizing heated unvaporized fuel within said container; and

(e) providing said fuel delivery mechanism with vaporized fuel from said container.

4,955,352

COMBINED SUPERCHARGER AND SUPERCHARGER COOLANT PUMP FOR AN INTERNAL COMBUSTION ENGINE

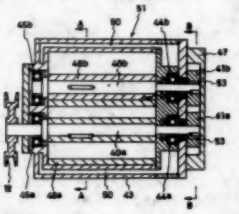
Toshio Takeda, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Feb. 15, 1989, Ser. No. 310,586

Claims priority, application Japan, Feb. 26, 1986, 63-023785; Feb. 26, 1988, 63-023784

Int. Cl.[5] F02B *33/38*; F04C *29/04*

U.S. Cl. 123—559.1 **5 Claims**



1. A combined supercharger compressor and pump for an internal combustion engine, comprising:

a housing having a compressible fluid inlet and a compressible fluid outlet connected to an internal combusion engine;

two parallel shafts journalled in said housing:

rotors mounted on each of said shafts and cooperating for compressing a fluid from said compressible fluid inlet;

means for supplying a rotational drive force from said engine to one of said shafts;

meshing gears in said housing and mounted on said shafts for transmitting rotational drive force from said one of said shafts to the other of said shafts;

an internal incompressible coolant fluid circuit in said housing, said meshing gears being positioned in said internal incompressible coolant fluid circuit, wherein said meshing gears comprise a gear pump for circulating an incompressible coolant fluid in said internal incompressible coolant fluid circuit, wherein said internal incompressible coolant fluid circuit is independent of a coolant circuit of said internal combustion engine and includes a coolant jacket in said housing and at least partially surrounding said rotors, whereby the compressed fluid is cooled by an incompressible coolant fluid in said jacket;

an external incompressible coolant fluid circuit communicating with said coolant jacket for circulating an incompressible coolant fluid in a closed loop with said internal incompressible coolant fluid circuit; and

a heat exchanger in said external incompressible coolant fluid circuit for cooling an incompressible coolant fluid therein,

whereby the compressor can be sufficiently cooled to cool the compressible fluid being compressed thereby.

4,955,353

PISTON FOR INTERNAL COMBUSTION ENGINE

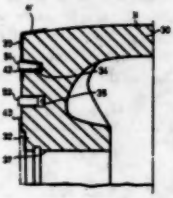
Atsushi Amataka; Kazumitsu Kushida, both of Tokyo; Koji Nakajima, and Hitoshi Yamamoto, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 2, 1988, Ser. No. 239,763

Claims priority, application Japan, Sep. 11, 1987, 62-227788

Int. Cl.[5] F02B *75/08*

U.S. Cl. 123—668 **12 Claims**



1. A piston head for operation in a combustion chamber of an internal combustion engine, which combustion chamber is formed to define a squish area in cooperation with said piston head, the cooperating region of said piston head being subject to generation of surface roughness due to excessive thermal conditions and in which said piston head is formed of a generally cylindrical skirt portion, a top surface containing said squish area at one end and a conically tapered annular surface intermediate said skirt portion and said top surface, and in which a heat resisting treated layer is applied only to the surface of said piston head that cooperates with said combustion chamber to form said squish area.

4,955,354

ARCHERY DEVICE WITH CONSTRAINED FOUR-BAR LINKAGE

John W. Bozek, 6093 Waterfront Dr., Waterford, Mich. 48095

Filed Mar. 9, 1989, Ser. No. 321,104

Int. Cl.[5] F41B *5/00*

U.S. Cl. 124—23.1 **15 Claims**

1. An archery device comprising:

an elongated limb holder member having an end portion at either end thereof;

a handle on said holder member;

a pair of elongated bendable limbs each having opposite ends;

mounting means mounting each of said limbs to a respective end portion of said holder member, said mounting means including two pairs of pivoted swing arms each pair drivingly connected to a respective limb and a respective end portion of said holder member, each of said two pairs of swing arms and portions of said limbs and holder member forming four bar linkage systems;

said swing arms each pivotably supported at one end on one said end portion of said holder member and at the other end pivotably mounted to a respective limb;

a drawstring tautly connecting outboard ends of said limbs; and

load cable means connected to the outboard end of each limb and including means restraining movement of each limb outboard end relative to said limb holder member, whereby as said drawstring is drawn, said limbs are caused to be swung to the rear, and said load cables causing flexing of said limbs as said limbs are swung to the rear by said constraining of said outboard ends thereof.

4,955,355

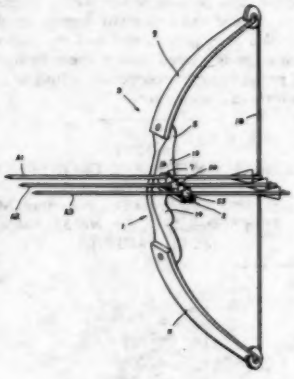
ARROW HOLDING AND LOADING DEVICE FOR ARCHERY BOWS

Gregory E. Pugh, 13635 Leroy, Southgate, Mich. 48195

Continuation-in-part of Ser. No. 76,798, Jul. 23, 1987, Pat. No. 4,823,762. This application Apr. 10, 1989, Ser. No. 336,016

Int. Cl.[5] F41B *5/00, 5/02, 5/06*

U.S. Cl. 124—52 **34 Claims**



9. An arrow holder and loader for an archery bow having a bow string and a shooting position for an arrow in which the arrow is axially aligned with the bow string, said loader comprising a frame and having a first means for supporting a first arrow in said shooting position, a carriage mounted on the frame for movement transverse to the shooting position and having a second means for releasably supporting a follow-up arrow in a pre-shooting position parallel to said shooting position and to said first arrow, said first means for supporting a first arrow being isolated from said transverse movement of said carriage and third means for moving the carriage on the frame to carry the follow-up arrow along a path of sidewise movement of the follow-up arrow from said pre-shooting position into said shooting position wherein the follow-up arrow is axially aligned with the bow string.

4,955,356

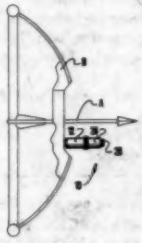
ARCHERY BOW STABILIZER AND TRACKER

Michael L. Pike, 5145 Keyes Dr., and William A. McCormick, 5113 E. D. E Ave., both of Kalamazoo, Mich. 49004

Filed Nov. 15, 1990, Ser. No. 436,694

Int. Cl.[5] F41B *5/00*

U.S. Cl. 124—89 **11 Claims**



6. An archery bow stabilizer and tracker, comprising:

a first body member;

a first central cylindrical bore formed in said first body member;

means at a first end of said first body member for engagement with an archery bow;

a second body member;

a second central cylindrical bore formed in said second body member;

abutting first and second radial flanges on said first and second body members;

and

means for securing said second body member to a second end of said first body member, opposite said first end.

4,955,357

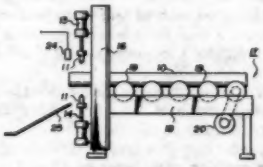
METHOD AND APPARATUS FOR CUTTING POLYCRYSTALLINE SILICON RODS

Masakatsu Takeguchi, Suzuka; Takashi Yamamoto, and Mamoru Nakano, both of Yokkaichi, all of Japan, assignors to Hi-Silicon Co., Ltd., Japan

Filed Jan. 22, 1988, Ser. No. 147,213

Int. Cl.[5] B28D *5/04*

U.S. Cl. 125—23.01 **11 Claims**



1. A method of cutting a polycrystalline silicon rod comprising:

A. placing the silicon rod on a roller conveyor;

B. feeding the silicon rod to a position adjacent to at least three cutting edges, each cutting edge having an angle of between 60° and 120°, said cutting edges being arranged in a plane perpendicular to, angularly disposed about and equidistantly positioned about said rod;

C. applying a first hydraulic force to each of said at least three cutting edges to bring said edges into engagement with said rod; and

D. applying a second hydraulic force greater than the first force to each of said at least three cutting edges to instan-

taneously sever the rod by brittle fracture along a direction of the pressing forces and in a direction parallel to a circumference of the rod.

4,955,358

BARBECUE GRILL CART ASSEMBLY

Rodney G. Harris, Salem; John Seal, Auburn, both of Ala.; Robert L. Johnston, and Marvin R. Windham, both of Columbus, Ga., assignors to W. C. Bradley Company, Columbus, Ga.

Filed Aug. 11, 1989, Ser. No. 392,790

Int. Cl.[5] F24D *3/00*

U.S. Cl. 126—25 R **9 Claims**

1. A barbecue grill cart assembly comprising a plurality of generally vertical leg members with spaced, opposing, generally horizontal strut means connected to said leg members for providing a generally horizontal frame structure, said strut means having an upper flange portion for receiving a barbecue grill and a laterally extended flange means at each end thereof, each for engaging a selected one of said leg members with said leg members being received between said flange means and said upper flange portion for providing a plurality of contact points to prevent twisting and swaying of said leg member, and securing means disposed through said flange means and said leg members for fastening said assembly together.

4,955,359

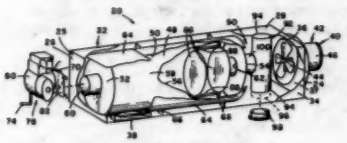
FURNACE WITH COUNTERFLOW HEAT EXCHANGE MEANS

Eugene C. Briggs, Bowling Green, Ky., and Myron T. Cooperrider, North Royalton, Ohio, assignors to Robert Sun Company, Nashville, Tenn.

Filed Aug. 8, 1989, Ser. No. 391,101

Int. Cl.[5] F24H *3/00*

U.S. Cl. 126—110 R **17 Claims**



1. A furnace comprising:

substantially enclosed housing means having opposite first and second ends, sidewalls extending between said first and second ends, an air intake associated with said first end, and an air discharge vent associated with said second end;

means for moving air from said air intake to said air discharge vent so that air moved by said air-moving means moves air from said first end to said second end and generally axially along said housing means;

a heat exchanger including an elongated hollow body having two opposite ends and defining inner and outer surfaces, one of said hollow body ends providing an outlet end for said body and the other of said hollow body ends providing an inlet end for said body, said heat exchanger being supported within so as to extend axially along said housing means and so that air flowing from said air intake to said air discharge vent passes along the outer surface of the heat exchanger body from said one body end to the other body end;

a fuel burner assembly associated with said inlet end of said heat exchanger for directing a flame and attending combustion products directly into the heat exchanger body at said inlet end so that the inner surface of the heat exchanger absorbs heat generated by the flame and combustion products and so that the flame is directed by the fuel burner assembly generally axially of the heat exchanger toward the outlet end thereof;

means associated with the heat exchanger for delivering air to the burner assembly for combustion purposes and so that combustion products discharged from said burner assembly move toward and through the outlet end of the heat exchanger; and

a flue discharge conduit supported within said housing means adjacent said first end thereof and operatively connected in flow communication with said heat exchanger body at the outlet end thereof so that combustion products moving through the outlet end of said heat exchanger body are routed by said flue discharge conduit out of said housing means; and

said inlet end of said heat exchanger body is tapered in shape so that the transverse cross-sectional area of said heat exchanger body increases in size as a path is traced axially through said heat exchanger body toward said outlet end thereof.

4,955,360

HEAT-GENERATING MATERIAL FOR PORTABLE HAIR CURLER

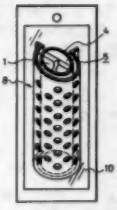
Yoshihiro Ogawa; Hiroo Takahashi, and Yoshinori Kikuchi, all of Kamaishi, Japan, assignors to Nippon Steel Corporation and Finetec Co., Ltd., both of Tokyo, Japan

Continuation-in-part of Ser. No. 179,221, Apr. 8, 1988, abandoned. This application Feb. 28, 1989, Ser. No. 316,965

Claims priority, application Japan, Apr. 10, 1987, 62-53478; Jul. 16, 1987, 62-108285

Int. Cl.[5] F24J *1/00*

U.S. Cl. 126—263 **3 Claims**

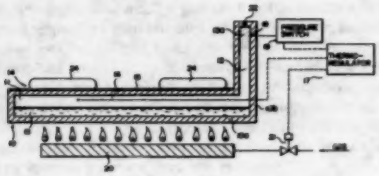


1. A heat generator for a portable hair curler, which comprises (1) a heat-generating agent comprising 62.7±3.0% of an iron powder, 0.6±0.2% of NaOH, 21.5±4.0% of zeolite, 1.8±1.2% of an active carbon, 3.1±2.0% of NaCl, and 10.3±3.0% of water, the total amount being 100.0%, and (2) a bag for containing said heat-generating agent, which bag has vent pores for diffusing steam generated from the heat-generating agent to the outside to bring the hair into contact with said steam, and which bag has an air permeability of 60 to 1000 seconds as determined according to JIS P-8117.

4,955,361
HOT PLATE

Junji Sotani, and Chiyoshi Sasaki, both of Yokohama, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 312,035
Claims priority, application Japan, Oct. 31, 1986, 61-259762
Int. Cl.[5] F28D *21/00*
U.S. Cl. 126—374 22 Claims



1. A hot plate, comprising:

a heat pipe including a heating plate means for receiving a piece to be heated thereon, means defining a heating chamber located under said heating plate means and including a lower section, an upper section extending upward from said lower section and having said chamber therein, and an upper surface having said heating plate means thereon, means defining a gas chamber having a non-condensed gas receiving space located above said heating chamber outside said heating plate means, and means defining a path for communicating said heating chamber with said non-condensed gas receiving space, and wherein said heating plate means comprises plural plates made of different materials and placed one upon the other on said upper surface which serves as a heating surface;

a liquid contained in said heating chamber, the upper level of said liquid being located under and spaced from said heating plate means so as to define an evaporation space between said upper liquid level and said heating plate means; and

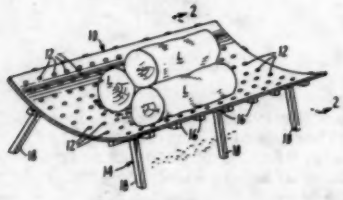
heating means for heating said liquid in said heating chamber to evaporate said liquid to generate evaporated gas in said evaporation space for heating said heating plate means;

said path defining means communicating said evaporation space with said gas receiving space for transferring non-condensed gas generated from said heated liquid from said evaporation space to said gas receiving space.

4,955,362
LINER FOR FIREPLACE GRATE

Ronald W. Underdown, 735 So. Fairway, Fresno, Calif. 93727, assignor to Ronald W. Underdown, Fresno, Calif.

Filed Sep. 21, 1988, Ser. No. 247,071
Int. Cl.[5] F23H *13/00*
U.S. Cl. 126—540 4 Claims



1. A fireplace grate liner for enhancing the combustion of wooden logs and like fuel intended for burning on a fireplace grate consisting:

a single sheet of mild steel having a thickness sufficient to impart rigidity thereto, and length and width of generally rectangular shape approximating the upper surface of a fireplace grate, operable to be supported by that upper surface of a fireplace grate, said sheet having an upward face of concave shape along the length thereof, said upward face being substantially free of protrusions;

said steel sheet having draft control means for directing airflow through said steel sheet, said draft control means defined by a plurality of uniformly spaced apertures extending through the thickness and entirely placed within the outer edges thereof;

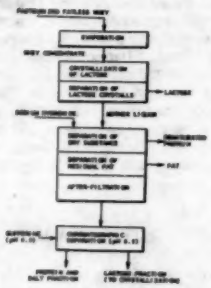
each of said apertures being of uniform diameter and providing even flow of combustion gases through steel sheet to insure efficient burning of said fuel;

and said steel sheet having a ratio of a top surface area of solid metal to open surface area, as provided by said apertures, ranging from about 5 percent perforated area and 95 percent solid surface area to about 18 percent perforated area and 82 percent solid surface area.

4,955,363
PROCESS OF RECOVERING LACTOSE FROM WHEY

Matti E. Harju, Nummela, and Heikki O. Heikkilä, Espoo, both of Finland, assignors to Valio Meijerien Keskusosuuskunta, Helsinki, Finland

Filed Oct. 12, 1988, Ser. No. 256,600
Claims priority, application Finland, Oct. 14, 1987, 874535
Int. Cl.[5] C13F *1/04, 1/12*; C13D *3/14, 3/16*
U.S. Cl. 127—46.1 6 Claims



1. A method of recovering lactose from milk whey or cheese whey comprising the steps of

(a) concentrating the whey;

(b) crystallizing part of the lactose in the whey;

(c) separating the resulting lactose crystals from the resulting mother liquor;

(d) drying the lactose crystals;

(e) adjusting the pH of the mother liquor to about 5.8 to 7.9;

(f) heating the pH-adjusted mother liquor to about 60 to 70° C. whereby a precipitate is formed;

(g) removing the precipitate by centrifuging the heated mother liquor and decanting the resulting supernatant to recover a purified mother liquor;

(h) chromatographically fractionating the purified mother liquor at a temperature of about 50 to 75° C., and a pH of about 5.5 to 7 using sulphonated polystyrene resin which is in sodium ion form and cross-linked by a 3–6% by weight divinylbenzene and which is even-grained, the average grain size being about 0.2 to 1 mm; the flow rate of the purified mother liquor being about 0.4 to 1.5 m^3/h, whereafter elution is carried out with water; and

(i) recovering at least the following fractions;

(1) a protein fraction, fractions;

(2) an intermediate fraction comprising lactose and other impurities which is recirculated to the fractionating step (h), and

(3) a lactose fraction which is passed to the crystallization step (b).

4,955,364

FRUCTOSE SYRUPS AND SWEETENED BEVERAGES

Dorothy C. White, Argenta, and Carl W. Niekamp, Forsyth, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Mar. 25, 1988, Ser. No. 173,404
Int. Cl.[5] C13F *1/14, 1/04*
U.S. Cl. 127—63 14 Claims

1. A method of preparing a fructose syrup sweetener comprising:

(a) dissolving an amount of a crystalline saccharide composition comprised of crystalline fructose sufficient to obtain a potable liquid comprised of water and from about 70% by weight to about 80% by weight dry saccharide solids, at least about 98% by weight of said dry saccharide solids being fructose, and

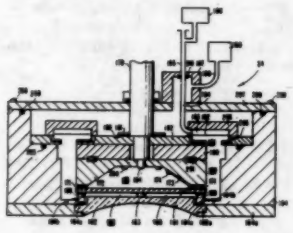
(b) storing said liquid for a period of at least one day at a pH of from 3.5 to 5.5.

4,955,365

LOCALIZATION AND THERAPY SYSTEM FOR TREATMENT OF SPATIALLY ORIENTED FOCAL DISEASE

Francis J. Fry, and Narendra T. Sanghvi, both of Indianapolis, Ind., assignors to Laboratory Equipment, Corp., Mooresville, Ind.

Continuation of Ser. No. 163,259, Mar. 2, 1988. This application Jun. 22, 1989, Ser. No. 370,272
Int. Cl.[5] A61B *17/22*
U.S. Cl. 128—24 A 7 Claims



1. An ultrasound treatment transducer assembly for directing a focused beam at an anatomical site, said transducer assembly comprising:

an acoustic focusing lens having a concave front surface and a substantially flat back surface;

a substantially flat piezoelectric transducer plate disposed in spaced relation to said focusing lens and having a rear surface and a front surface which is disposed at a fixed distance of separation with respect to the back surface of said acoustic focusing lens;

an acoustic coupling medium disposed between the back surface of said focusing lens and the front surface of said transducer plate;

first pressurizing means cooperatively arranged with said acoustic coupling medium for maintaining said acoustic coupling medium between said transducer plate and said focusing lens at a desired pressure; and

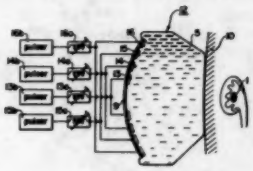
air pressure means cooperatively arranged relative to the rear surface of said transducer plate and adapted to apply air pressure against said rear surface, wherein the pressure applied against said rear surface by said air pressure means is higher than the pressure on the front surface of said transducer plate due to said acoustic coupling medium.

4,955,366

ULTRASONIC THERAPEUTICAL APPARATUS

Naoki Uchiyama; Syuichi Takayama, both of Hachioji; Masakazu Gotanda, Sagamihara; Tetsumaru Kubota, Hachioji; Takashi Tsukaya, Hachioji; Kouichiro Ishihara, Hachioji; Kuniaki Kami, Hachioji; Naomi Sekino, Hachioji; Akira Murata, Hachioji, and Masaki Hayashi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Nov. 15, 1988, Ser. No. 271,662
Claims priority, application Japan, Nov. 27, 1987, 62-298989; Jun. 15, 1988, 63-149037; Jun. 15, 1988, 63-149038
Int. Cl.[5] G01N *29/00*; A61B *8/00*
U.S. Cl. 128—24 A 25 Claims



1. An ultrasonic therapeutic apparatus for treating a target area to be treated within a body by directing and focusing externally generated ultrasonic waves thereto comprising:

an ultrasonic wave generator including a plurality of ultrasonic vibrators for directing and focussing generated ultrasonic waves upon a target to be treated;

said plurality of ultransonic vibrators being divided into at least two groups of vibrators, with each of said groups having a different driving frequency;

control means for controlling the phase of the ultrasonic wave generated by each of said groups of ultrasonic vibrators so that ultrasonic waves generated by each of said groups are focussed at the same point at which ultrasonic wave pressure becomes maximum;

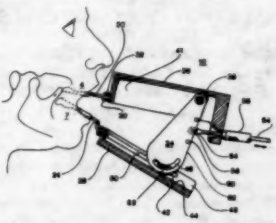
said control means also controlling the driving frequencies so that fundamental frequencies of the ultrasonic vibrators of each of said groups have a multiple relation with each other.

4,955,367

CAM-OPERATED OSCILLATOR SYSTEM FOR THE MANDIBLE

Charles A. Homsy, Houston, Tex., assignor to Dynamax, Ltd., Tortola, British Virgin Isls.

Filed Jan. 19, 1989, Ser. No. 299,197
Int. Cl.[5] A61H *1/02*
U.S. Cl. 128—25 R 4 Claims



1. In a fully-involuntary mandible oscillator system adapted to forcefully impose on the use rhythmic mandibular move-

ments, an upper splint having a first portion adapted to be releasably secured to the user's upper jaw and having a second portion which extends extraorally, and a lower splint having a third portion adapted to be releasably secured to the user's lower jaw and having a fourth portion which extends extraorally; said system comprising:

an appliance coupled to said second and fourth portions; and

extraoral, cam-operated oscillating means coupled to said appliance for forcibly oscillating the lower jaw within a predetermined angular range between a start position and an end position, whereby during one-half cycle of oscillation the lower jaw is forced to move away from the upper jaw, and during the other half-cycle the lower jaw is forced to move toward the upper jaw.

4,955,368

CERVICAL COLLAR

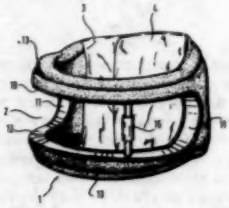
Dieter Heimann, Koenigsberger Ring 99, D-2340 Kappeln, Fed. Rep. of Germany

Filed Jul. 19, 1988, Ser. No. 221,077

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724885

Int. Cl.[5] A61F *5/00*

U.S. Cl. 128—75 **16 Claims**



1. A cervical collar to immobilize the cervical vertebral column, comprising:

a padded collar member for closure about a patient's neck having a cervical support (1) in the front of said collar member, said cervical support comprising a one piece flexible frame of continuous flat material having upper and lower segments (10,12) interconnected by a pair of arcuate segments (11), wherein a clearance (2) is defined between the upper segment, the lower segment, the arcuate segments in said front of said collar member, said padded collar member encompasses said cervical support, a single supporting spacing means mounted between said upper and lower segments whereby said support is substantially rigid in the region of said single supporting spacing means adapted to support the head of a patient and is elastically deforming in other regions where said single supporting spacing means is not present.

4,955,369

DYNAMICALLY SHIFTABLE COUNTER SHEAR FORCE KNEE BRACE

Gary R. Bledsoe, 316 Clayton, Grand Prairie, Tex. 75052, and Brett O. Bledsoe, 2509 Corkwood Pl., Arlington, Tex. 76017

Filed Oct. 27, 1988, Ser. No. 263,065

Int. Cl.[5] A61F *5/04*

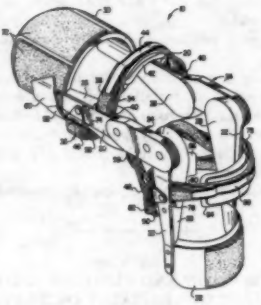
U.S. Cl. 128—80 C **18 Claims**

1. A knee brace, connectable to a human leg having thigh, knee and calf portions, for compensating for loss of or damage to the anterior cruciate ligament of the leg by creating a counteractive anterior-posterior shear force across the knee which opposes an oppositely directed anterior-posterior shear force across the knee generated by the quadriceps muscle of the leg during leg extension, and tending to cause an anterior shift of the tibia relative to the femur, said knee brace comprising:

first and second elongated rigid thigh support members positionable to longitudinally extend lengthwise along the lateral and medial sides of the thigh with inner end portions of the thigh support members positioned adjacent the knee;

first and second elongated rigid calf support members positionable to longitudinally extend lengthwise along the lateral and medial sides of the calf with inner end portions of the calf support members positioned adjacent the knee;

attachment means for firmly attaching said thigh and calf support members to the thigh and calf, respectively, for movement therewith, and for transmitting to the thigh and



calf anteriorly and posteriorly directed forces imposed on said thigh and calf support members; and

first and second hinge means, each having a plurality of pivot axes, said first and second hinge means being positionable on opposite sides of the knee for pivotally connecting said inner end portions of said thigh support members to said inner end portions of said calf support members, said first and second hinge means being operative to create a relative anterior-posterior shift between said thigh and calf support members, in response to extension of the leg, in a manner causing said attachment means to generate said counteractive shear force.

4,955,370

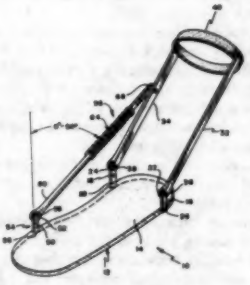
ACHILLES TENDON REHABILITATION BRACE AND METHOD FOR ITS MANUFACTURE

Kenneth A. Pettine, 201 Threadneedle Rd., East, Augusta, Ga. 30907

Filed Apr. 4, 1989, Ser. No. 332,895

Int. Cl.[5] A61F *3/00*

U.S. Cl. 128—80 E **8 Claims**



1. An Achilles tendon rehabilitation brace attachable to a shoewear for protecting motion that may be imposed on a

repaired Achilles tendon following surgical anastomosis comprising

a rugged slip resistant sole means, medial and lateral uprights, a flexible spring resilient strap, an extensible link means,

means for shoewear to be received and secured upon an edge of the rugged slip resistant sole means,

side arms having upper and lower extremities vertically disposed proximate an ankle of the user, the lower extremities being securely attached to the sole means, the upper extremities being pivotally securely attached to a lower terminus of the corrsponding medial and lateral uprights,

the upper terminus of the medial and lateral uprights being coupled to said flexible, spring resilient strap for engaging upon a calf area of a user's leg,

toe arm means having upper and lower extreme ends generally vertically disposed proximate the instep side of the shoewear, the lower extreme end being securely attached to the sole means, the upper extreme end being pivotally and securely attached to a lower terminus of said extensible link means,

an upper terminus of the link means being coupled to an instep side of the strap, and

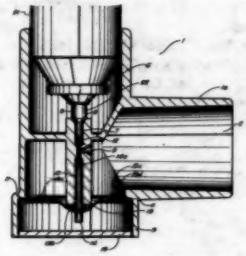
tension adjustable spring means included within the link means to urge and extend a user's ankle into plantar flexion.

4,955,371

DISPOSABLE INHALATION ACTIVATED, AEROSOL DEVICE FOR PULMONARY MEDICINE

Gene Zamba, Brooklyn, Conn., and Stephen C. Glazier, New York, N.Y., assignors to Transtech Scientific, Inc., New York, N.Y.

Filed May 8, 1989, Ser. No. 348,424
Int. Cl.[5] A61M *16/00*
U.S. Cl. 128—200.18 **21 Claims**



1. An inhalation device for dispensing a medicament to a patient from a dispenser comprising:

a body having an outwardly extending nozzle;

a receptacle formed within said body for receiving said dispenser;

an activator means positioned within said body, said activator means being mechanically interactive with the inhalation of said patient, said activator means for causing said dispenser to pass said medicament outwardly through said nozzle, said activator means being responsive to a change in air pressure within said nozzle, said activator means causing said dispenser to release said medicament upon the reduction in air pressure, said activator means comprising a diaphragm within said body, said diaphragm being deformable upon a reduction in air pressure within said nozzle; and

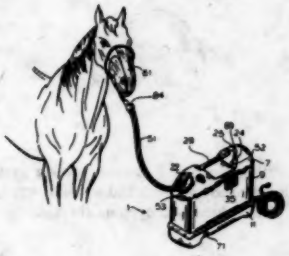
a vent formed in said body for carbureting air into said nozzle upon the inhalation by said patient.

4,955,372

METHOD AND APPARATUS FOR PULMONARY AND CARDIOVASCULAR CONDITIONING OF RACEHORSES AND COMPETITION ANIMALS

Richard H. Blackmer, Scotia, and Jonathan W. Hedman, Burnt Hills, both of N.Y., assignors to Transpirator Technologies, Inc., Somerset, N.J.

Continuation of Ser. No. 841,300, Mar. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 755,562, Jul. 16, 1985, Pat. No. 4,722,334. This application Nov. 13, 1989, Ser. No. 436,085
Int. Cl.[5] A61M *15/00*
U.S. Cl. 128—203.16 **23 Claims**



1. A veterinary method useful for the therapeutic treatment of an animal respiratory tract comprising the step of delivering to the animal's respiratory tract a substantially sterile humidified vapor-phase stream of gas at a dew point temperature which is greater than the normal body temperature of the animal at a rate in excess of 60 liters per minute to condition the animal's respiratory, pulmonary and cardiovascular system.

12. An apparatus for delivering to a veterinary animal's respiratory tract a humidified steam of gas at a dew point temperature greater than the ambient dew point temperature and also at a temperature greater than the normal body temperature of the animal so as to deposit water on the walls of the respiratory tract comprising:

a container for storing a reservoir of water;

means for heating the water in the reservoir to cause vapor to form in said container at a dew point temperature greater than the ambient dew point temperature and also at a temperature greater than the normal body temperature;

a blower means for providing a stream of gas in excess of 60 liters per minute; and

a conduit means for conveying the stream of gas into contact with the vapor used and for conveying the stream of humidified gas to the respiratory tract of the animal.

4,955,373

AIR BREATHING ASSEMBLY AND AIR FILTER ATTACHMENT THEREIN

John N. Maguire, III, 149 Cabana Rd., Myrtle Beach, S.C. 29572

Filed Oct. 16, 1989, Ser. No. 421,970
Int. Cl.[5] A62B *7/10*
U.S. Cl. 128—205.27 **7 Claims**

1. An air filter attachment comprising:

a fitting having attachment means thereon for manually connectable and releasable attachment to an air filter in substantially air-tight fashion, said fitting having an air passageway therein for passing air from the filter;

fastener means on said fitting for manually connectable and releasable attachment to a person's clothing;

a hose extending up from said fitting and communicating with said air passageway on the fitting;

and a breathing device on the upper end of said hose;

said attachment means on said fitting bring an annular neck

for slidable reception in a complementary opening in the air filter, said neck having outwardly projecting tabs thereon for engagement with the air filter at said opening therein;

and said fitting having an annular sealing gasket thereon extending around said neck and sealingly engageable with the air filter behind said opening therein.

4,955,374

CLOSED CYCLE GAS MASK AND BREATHING EQUIPMENT FOR OPERATION UNDER PRESSURE HAVING A SEVERANCE-OPERATED CONNECTION SHUT-OFF FOR THE BREATHING EQUIPMENT

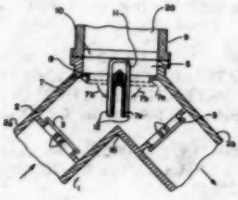
Adalbert Pasternack, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed May 17, 1989, Ser. No. 353,400

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823383

Int. Cl.[5] A62B *18/10*

U.S. Cl. 128—207.12 6 Claims



1. A gas mask construction comprising a tubular breathing gas connection, a detector actuator mounted on said breathing gas connection, a breathing gas fitting engageable with said breathing gas connection, and valved passage means carried by one of said breathing gas connection and said breathing gas fitting and opening said valve passage means when they are interconnected and closing said breathing gas fitting upon severance of the connection between said breathing gas fitting and said breathing gas connection.

4,955,375

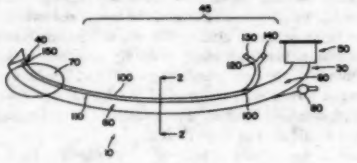
ENDOTRACHEAL TUBE WITH CHANNEL FOR DELIVERING DRUGS

Ricardo Martinez, 21 Needleridge Ct., San Mateo, Calif. 94402

Filed Jan. 23, 1989, Ser. No. 300,968

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—207.15 15 Claims



7. An endotracheal tube, comprising:

a proximal end;

a distal end;

a central body having a first wall defining a first lumen; and

a second wall attached to said first wall within said first lumen, forming a second lumen between said first and second walls, said second wall being formed from a distensible, elastic material;

wherein said first wall includes an opening connected to said second lumen for introduction of medications therethrough into said second lumen, and wherein said second wall has a first side forming at least a portion of said first lumen and a second side forming at least a portion of said second lumen, such that pressure within said first lumen is transmitted through said second wall to said second lumen for propelling said medication towards said distal end.

4,955,376

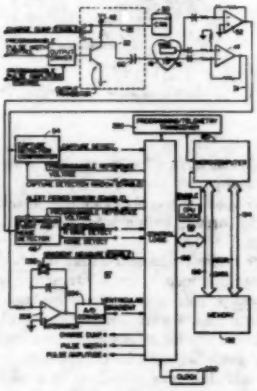
PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Teletronics N.V., Curacao, Netherlands Antilles

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,532

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 PG 3 Claims



1. A pacemaker comprising means for generating pacing pulses; means for sensing an evoked potential in response to the generation of a pacing pulse; means responsive to the failure to sense an evoked potential following the generation of a pacing

pulse for increasing the pacing rate so that if said failure was due to a fusion beat, then the next pacing pulse is more likely to result in heart capture; means for controlling the generation of a back-up pacing pulse responsive to the failure to sense an evoked potential; means responsive to the failure to sense an evoked potential following the generation of a back-up pacing pulse for determining that the preceding pacing pulse resulted in a fusion beat; and means responsive to the sensing of an evoked potential following the generation of a back-up pulse for determining that the preceding pacing pulse resulted in a heart capture failure.

4,955,377

DEVICE AND METHOD FOR HEATING TISSUE IN A PATIENT'S BODY

Charles D. Lennox, 75 Ledgewood Hills Dr., Nashua, N.H. 03062; Richard A. Noddin, 1390 Washington St., Holliston, Mass. 01746, and Ronald Sahatjian, 29 Saddle Club Rd., Lexington, Mass. 02173

Filed Oct. 28, 1988, Ser. No. 263,815

Int. Cl.[5] A61F 7/12

U.S. Cl. 128—401 **27 Claims**

1. Device for heating tissue, comprising

a chamber constructed for insertion into a patient's body,

an electrically conductive fluid preselected for resistive heating for filling the chamber,

a plurality of spaced electrical contacts enclosed within the chamber and a corresponding plurality of conductors for connecting the electrical contacts to a power supply for applying a radio frequency electrical potential between the contacts, said contacts being exposed to the fluid-containing space of said chamber so that said radio frequency electrical potential can cause current to flow through fluid between the contacts, said chamber and said contacts being cooperatively constructed and arranged to cause said current to be confined to said fluid within the chamber,

whereby on the basis of I^2R losses of said radio frequency electric current flowing between the electrical contacts, the fluid can be heated and the fluid in turn can heat the surrounding tissue by thermal conduction through a wall of the chamber.

4,955,378

APPARATUS AND METHODS FOR PERFORMING ELECTROFUSION AT SPECIFIC ANATOMICAL SITES

Robert J. Grasso, Tampa, Fla., assignor to University of South Florida, Tampa, Fla.

Continuation-in-part of Ser. No. 189,206, May 2, 1988. This application Jan. 17, 1989, Ser. No. 297,218

Int. Cl.[5] A61N 1/32

U.S. Cl. 128—421 **11 Claims**

1. A device for confining flow of electrons through living tissue to a preselected area of said tissue, comprising:

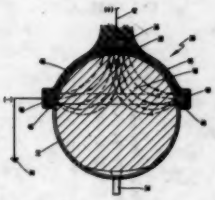
a first electrode means adapted to be disposed in abutting relation to a first preselected area of tissue;

a second electrode means, generally annular in configuration, adapted to be disposed in abutting relation to a second preselected area of tissue having a generally spherical shape, said second preselected area of tissue being in closely spaced proximity to said first preselected area of tissue;

a source of electrical power;

means for electrically coupling said source of electrical power to said first electrode means; and

means for grounding said second electrode means;



whereby in vivo electrofusion occurs at the interface of said first preselected area of tissue and said first electrode means.

4,955,379

MOTION ARTEFACT REJECTION SYSTEM FOR PULSE OXIMETERS

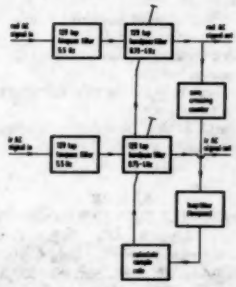
Peter R. Hall, Dyfed, United Kingdom, assignor to National Research Development Corporation, London, England

Filed Aug. 8, 1988, Ser. No. 229,692

Claims priority, application United Kingdom, Aug. 14, 1987, 8719333

Int. Cl.[5] A61B 5/00

U.S. Cl. 128—633 **6 Claims**



1. In a pulse oximeter for making a measurement of blood oxygen saturation which produces pulsatile signals in response to a patient's pulsating arterial blood flow in a first variable range of frequencies and motion artefact signals at frequencies outside of said first variable range of frequencies, apparatus for minimizing the effect of said motion artefact signals on said measurement of blood oxygen saturation comprising

a tunable bandpass filter having an input to which said pulsatile signals and said motion artefact signals are applied;

a frequency determining means connected to the output of said tunable bandpass filter for determining the frequency of the pulsatile signals at the output of said tunable bandpass filter;

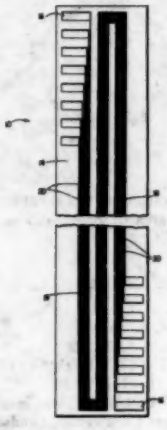
and a tuning means operatively connected to said frequency determining means and said tunable bandpass filter for tuning said tunable bandpass filter in response to said determined frequency to align the pass band of said band pass filter with the determined frequency of said pulsatile signals whereby motion artefact signals are attenuated.

4,955,380

FLEXIBLE MEASUREMENT PROBES

David J. Edell, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 15, 1988, Ser. No. 285,010
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—635 **7 Claims**



1. Apparatus for measuring temperature and perfusion comprising

two lead assemblies, each lead assembly comprising

a flexible substrate,

an electrical conductor photolithographically patterned on said substrate, and

insulation covering said conductor except for a small, exposed contact area, and

a thermal sensor bonded between said small contact areas on said two lead assemblies,

wherein a voltage drop across said thermal sensor is correlated with temperature, and

wherein a voltage drop of heat dissipation from said thermal sensor is correlated with perfusion.

4,955,381

MULTI-PAD, MULTI-FUNCTION ELECTRODE

Tim J. Way, Carlsbad, and L. Allan Butler, Oceanside, both of Calif., assignors to Cardiotronics, Inc., Carlsbad, Calif.

Filed Aug. 26, 1988, Ser. No. 237,513
Int. Cl.[5] A61B *5/402*; A61N *1/04*
U.S. Cl. 128—640 **9 Claims**

1. An electrode for stimulating and monitoring a patient's heart at or about the same time comprising:

a stimulating conductive polymer pad having a first surface for contacting a patient and delivering stimulating electrical impulses to that patient's heart, and having a second surface;

a monitoring conductive polymer pad having a first surface smaller in area than said stimulating pad first surface for contacting that patient and receiving electrical impulses from that patient's heart at or about the same time that said stimulating electrical impulses are being delivered, and having a second surface;

a peelable cover substantially covering said first polymer pad surfaces when the electrode is not in use;

a metal foil cover having substantially the same shape as the stimulating conductive polymer pad and having a front surface substantially covering the second surface thereof, and having a back surface;

a metal foil cover having substantially the same shape as the monitoring conductive polymer pad and having a front surface substantially covering the second surface thereof, and having a back surface;

a plastic foam cover adhered against the back surfaces of the metal foil covers and having two holes exposing apart of each metal foil cover;

two insulated wires having exposed ends which are respectively inserted into the two holes in the plastic foam cover and electrically coupled to the exposed part of the metal foil covers; and

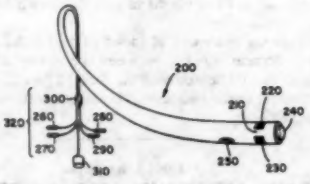
a wire retainer placed over the holes in the plastic foam cover after the wires have been inserted, which adheres to the plastic foam cover.

4,955,382

APPARATUS AND METHOD FOR RECORDING MONOPHASIC ACTION POTENTIALS FROM AN IN VIVO HEART

Michael Franz, Palo Alto, and Ingemar Lundquist, Pebble Beach, both of Calif., assignors to EP Technologies, Mountain View, Calif.

Division of Ser. No. 225,043, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 38,974, Apr. 16, 1987, abandoned, which is a division of Ser. No. 586,697, Mar. 6, 1984, Pat. No. 4,682,603. This application Apr. 3, 1989, Ser. No. 332,875
Int. Cl.[5] A61B *5/04*
U.S. Cl. 128—642 **9 Claims**



1. An apparatus for detecting monophasic action potential in an in vivo heart of a patient, comprising:

a catheter having a proximal end, a distal end having a terminal tip, and an exterior surface, said catheter being adapted for insertion into a patient for detecting said potentials;

a first electrode carried at said distal tip for contacting surface tissue of the heart of the patient for measuring potentials at said surface tissue;

a second electrode carried on said catheter and spaced from said first electrode for supplying a reference potential signal;

means carried by said catheter for maintaining said distal end in a substantially perpendicular configuration with respect to said surface tissue and with a substantially constant force against said surface tissue, for depolarizing heart

cells in a vicinity of said first electrode while avoiding injury to said cells;

first electrical means coupled to said first and second electrodes for generating signals representing said action potentials;

a third electrode carried on said catheter at a first distance from said first electrode;

a fourth electrode carried on said catheter at a second distance from said third electrode; and

second electrical means for providing a cardiac pacing signal to said third and fourth electrodes;

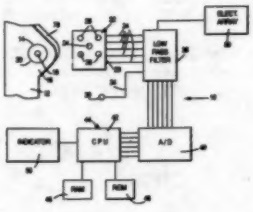
wherein said third and fourth electrodes comprise pacing electrodes for pacing the heart.

4,955,383

DISCRIMINANT FUNCTION ANALYSIS METHOD AND APPARATUS FOR DISEASE DIAGNOSIS AND SCREENING

Mark L. Faupel, Conyers, Ga., assignor to Biofield Corporation, New York, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,572
Int. Cl.[5] A61B *5/05*
U.S. Cl. 128—653 R **35 Claims**



18. An apparatus for disease screening or diagnosis at a potential disease site on a human or animal subject by measuring the electrical potentials which are a function of the electromagnetic field present in the subject on the skin surface of the subject in an area of said potential disease site comprising

reference electrode means adapted for contacting the skin surface of the subject at a reference location,

a plurality of test electrode means adapted for contact with the skin surface of the subject at spaced locations in the area of the potential disease site, each said test electrode means operating with said reference electrode means define a test-reference electrode means combination for to detecting electrical potential of the electromagnetic field present between said reference electrode means and said test electrode means during a test period and to provide a test potential as a function thereof,

analog-to-digital converter means connected to separately receive each said test potential and to provide a separate digital test signal indicative of each said test potential obtained during said test period,

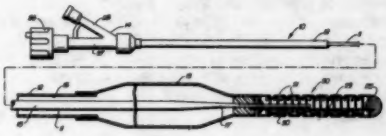
and processing means connected to separately receive each said separate digital test signal, said processing means operating to compare said digital test signals obtained during said test period to identify potential relationships therebetween indicative of the presence of a disease condition.

4,955,384

GUIDING MEMBER FOR VASCULAR CATHETERS WITH A FLEXIBLE LINK DISTAL SECTION

Charles S. Taylor, San Francisco, and Hilary J. Hampton, Santa Clara, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed May 11, 1989, Ser. No. 350,580
Int. Cl.[5] A61B *6/00*
U.S. Cl. 128—657 **16 Claims**



1. An elongated guiding member for a vascular catheter comprising:

(a) an elongated core member having a tapered distal portion;

(b) a flexible length of interfitting links, each link having a base with an aperture and a plurality of arms which extend from the base and which have means to engage an adjacent link, with the distal portion of the core member extending through the apertures provided in the bases; and

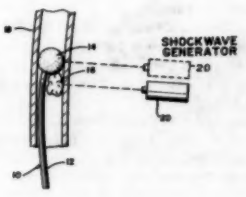
(c) means to secure at least one end of the flexible length of interfitting links to the core member.

4,955,385

ULTRASOUND TARGETING SYSTEM FOR SHOCKWAVE LITHOTRIPSY

Michael L. Kvalo, Oxford, Ga., and Culley C. Carson, Durham, N.C., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Feb. 6, 1989, Ser. No. 306,549
Int. Cl.[5] A61B *17/22*
U.S. Cl. 128—660.03 **14 Claims**



13. A method of targeting a stone within a body cavity by ultrasound for treatment of the stone by shockwave lithotripsy comprising the steps of; introducing an ultrasound target within the body cavity, positioning the target immediately adjacent the stone, locating the target using ultrasound and focusing a shockwave generator relative to the target, whereby a focused shockwave is directed to the stone, said stone having a distal side and said target having a proximal side; and wherein the step of positioning said target further comprises positioning said target on the distal side of the stone, whereby said stone is in a known position relative to the target, said step of focusing the shockwave generator further comprises focusing to the proximal side of the target. cm **14.** A mehtod of targeting a stone within a body cavity by ultrasound for treatment of the stone by shockwave lithotripsy comprising the steps of; providing a catheter including a leading end with an ultrasound target thereat, introducing the leading end of the catheter and the target into the body cavity, positioning the target immediately adjacent the stone, ultrasonically locating

the target and focusing a non-invasive shockwave lithotriptor relative to the located target and on the stone to target the stone for emitted shockwaves, thereby enabling treatment of the stone.

4,955,386

PULSE DOPPLER FLOW SPEED METER

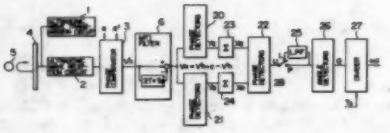
Hisashi Nishiyama; Kageyoshi Katakura, both of Tokyo; Shizuo Ishikawa, Kanagawa, and Toshio Ogawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 277,543, Nov. 29, 1988, abandoned. This application Dec. 27, 1989, Ser. No. 456,608

Claims priority, application Japan, Nov. 27, 1987, 62-297573; Dec. 11, 1987, 62-311951; May 20, 1988, 63-121716

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—661.09 **9 Claims**



1. A pulse doppler flow speed meter comprising:

a sound wave transmission means for transmitting, a pulsed continued ultrasonic sound wave at at least a first and second transmission intervals interatively toward an object;

sound wave reception means for detecting, a sound wave signal reflected by said object;

phase detection means for detecting, a phase signal in the reflected signal by mixing the reflected signal at each reception with a reference signal;

an MTI filter which performs filtering with the same filtering characteristics for phase signals corresponding to said first transmission interval and phase signals corresponding to said second transmission interval among the phase signals provided sequentially by said phase detection means by employing an unchanged delay time on respective filtering operations;

first phase difference detecting means for detecting, sequentially a phase difference between a phase signal at the present time point and a phase signal at a preceding time point among phase signals passing sequentially through said MTI filter;

second phase difference detection means for detecting, a phase difference between a first phase difference ascribed to said first transmission interval and a second phase difference ascribed to said second transmission interval among phase differences detected sequentially by said first phase difference detection means; and

means for transforming the output of said second phase difference detection means into the speed of said object.

4,955,387

METHOD AND APPARATUS FOR GUILT DETECTION

Paolo Simonutti, 1 Tony St., Harmelia, 1406, and John O. Speedy, 11 Rietbok Rd., Robinhills, Randburg, both of Transvaal, South Africa

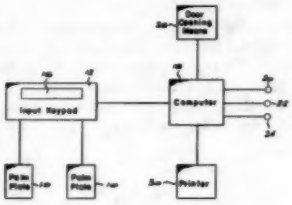
Filed May 28, 1985, Ser. No. 738,215

Claims priority, application South Africa, May 28, 1984, 84/4033

Int. Cl.[5] A61B *5/024*

U.S. Cl. 128—687 **13 Claims**

1. Apparatus for use in combatting theft from a premises, comprising a pulse rate detector having detector plates adapted to be contacted by the palms of a person leaving the premises and means responsive to the pulses detected by the plates to compute an instantaneous pulse rate reading, means for comparing the instantaneous pulse rate with a predetermined pulse rate, means for producing a discernible signal at least when the instantaneous pulse rate exceeds the predetermined pulse rate, said means for comparing including means for comparing the instantaneous pulse rate with a stored average pulse rate computed from a history of pulse rate measurements conducted in respect of that person, and means for updating the stored average pulse rate with the instantaneous pulse rate, but only when the instantaneous pulse rate does not exceed the stored averaged pulse rate by more than a predetermined amount.



4,955,388

ELECTROENCEPHALOGRAPHIC ATTENTION MONITOR

Richard B. Silberstein, Victoria, Australia, assignor to Swinburne Limited, Victoria, Australia

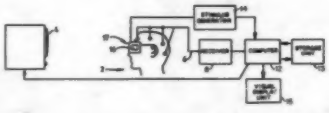
PCT No. PCT/AU86/00215, § 371 Date Mar. 30, 1987, § 102(e) Date Mar. 30, 1987, PCT Pub. No. WO87/00746, PCT Pub. Date Feb. 12, 1987

PCT Filed Jul. 28, 1986, Ser. No. 35,610

Claims priority, application Australia, Jul. 30, 1985, 01702/85

Int. Cl.[5] A61B *5/0484*

U.S. Cl. 128—731 **20 Claims**



1. A method of assessing the interest of a subject in a visual stimulus, by means of application of a control signal is combination with said visual stimulus, which control signal produces a distinguishable response in the subject, and measurement of said interest by reference to a change in said response, said method comprising the steps of

displaying a periodic visual control signal having a preselected frequency,

obtaining an electroencephalographic (EEG) signal from the subject whilst said visual control signal is being viewed, and

analysing the EEG signal to determine the magnitude of that component of the EEG signal which corresponds in frequency to said control signal,

wherein said method further comprises the steps of displaying said control signal and the visual stimulus simultaneously to the subject,

obtaining and analysing the EEG signal to determine the magnitude of said component during said simultaneous display,

determining the change in the magnitude of said component of the EEG signal, and

assessing the interest of the subject in said visual stimulus in accordance with said change.

4,955,389

APPARATUS FOR STIMULATION WITH OPTICAL STIMULI

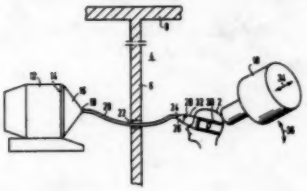
Siegfried Schneider, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich

Filed Jul. 22, 1988, Ser. No. 223,026

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1987, 3724842

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—731 **2 Claims**



1. In an apparatus for creating an optical stimulation in a patient who is positioned in chamber means for shielding the patient against outer magnetic fields, said chamber means including a SQUID-magnetometer means being mounted for movement relative to the patient for measuring of magnetic fields originating from the patient due to optically invoked potentials, the improvements comprising a glass fiber light waveguide having a first end face and a second end face, said glass fiber waveguide extending through a wall of said chamber means with the second end face being disposed within said chamber means, generator means for creating stimulation signals being arranged outside of the chamber means, said generator means having a first image plane where the stimulation signals are optically projectable, a first lens means being arranged adjacent said plane for projecting the stimulation signals of said image plane onto said first end face of the glass fiber light waveguide, a second image plane, a second lens means being arranged at the second end face of the glass fiber light waveguide within said chamber for transferring the optical stimulation signals received from said second end face onto said second image plane, mounting means for positioning the second end face of the light waveguide, the second lens means and the second image plane on a head of the patient so that the patient can perceive a picture that appears on the second image plane, and any structure disposed in said chamber means including the second lens means, the mounting means, and the light waveguide being composed of a non-magnetic material.

4,955,390

PROCESS FOR THE DETERMINATION OF THE PRESENCE OF A PSYCHEDELIC STATE

Hinderk M. Emrich, Theodolindenstrasse 6, D-8000 München 90, Fed. Rep. of Germany

Filed Feb. 24, 1989, Ser. No. 315,467

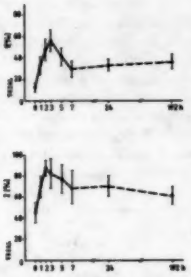
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805983

Int. Cl.[5] A61B *13/00*

U.S. Cl. 128—745 **3 Claims**

1. A process for the determination of the presence of a psychedelic state in a test subject comprising:

presenting the test subject with a three-dimensional, stereoscopically inverted image of an object, and



determining whether said test subject sees this image convexly or concavely within a predetermined period of time by means of a signal from the test subject.

4,955,391

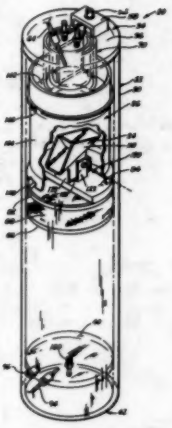
FLUID MONITORING APPARATUS

Robert L. Parker, and Charles G. Reed, both of Oklahoma City, Okla., assignors to Invenomed, Inc., Oklahoma City, Okla.

Continuation-in-part of Ser. No. 78,792, Jul. 27, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 333,468

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—771 **10 Claims**



1. A fluid monitoring apparatus comprising:

a canister having a tubular body portion with an upper end and a lower end;

a cover plate extending across the upper end of the tubular body portion of the canister, the cover plate having an entry port for introduction of liquid into the tubular body portion and a suction port so that air pressure within the tubular body portion can be lowered for drawing fluid into the entry port;

a floor plate extending across the lower portion of the tubular body portion of the canister;

volume indicator means disposed within the tubular body portion of the canister below the entry port for receiving the fluid introduced into the tubular body portion and providing an electrically sensible indication for each of a

series of selected volume increments of fluid introduced into the tubular body portion of the canister;

flow rate control means disposed between the entry port and the volume indicator means for limiting the flow rate of flow of fluid into the volume indicator means; and

a fluid separator mounted on the cover plate so as to be disposed within the tubular body portion of the canister, the fluid separator comprising:

a perforated cylindrical cup secured to the cover plate so as to extend about the entry and suction ports; and

a partition plate extending diametrically across the perforated cylindrical cup between the entry port and the suction port so as to divide the perforated cylindrical cup into non-communicating entry and suction chambers.

4,955,392

CONDOM OF THERMOPLASTIC ELASTOMER AND POLYOLEFIN FILM

Reuben Sorkin, 4721 University Dr., Coral Gables, Fla. 33146

Continuation-in-part of Ser. No. 148,724, Jan. 25, 1988, Pat. No. 4,808,174, which is a continuation-in-part of Ser. No. 93,933, Sep. 8, 1987. This application Mar. 23, 1989, Ser. No. 327,796

Int. Cl.[5] A61F *6/00*

U.S. Cl. 128—844 **7 Claims**

1. A condom of rubbery film material comprising a sleeve having an open proximal end and a closed end and being sized to receive an erect penis, said material comprising a blend of polyolefin material and thermoplastic elastomer material; said film material comprising an olefinic vulcanized blend of thermoplastic elastomer and low modulus polyolefin.

4,955,393

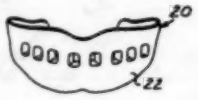
MOUTHGUARD WITH CONFORMABLE ARCH LINERS

Loren S. Adell, Dallas, Tex., assignor to Trident Laboratories, Inc., Sunnyvale, Tex.

Filed Mar. 30, 1988, Ser. No. 176,046

Int. Cl.[5] A61F *5/56*

U.S. Cl. 128—859 **10 Claims**



1. A mouthguard preform comprising a body having at least one trough for an arch, liner material disposed in said trough for securing an impression of the teeth of the arch when deformed by said teeth and thereby conforming the mouthguard to the teeth of the arch when the preform subsequently becomes a usable mouthguard; and joining means joining the liner material to said body comprising mechanical interlocking means for mechanically interlocking the liner to the body, in which said interlocking means is disposed at the occlusal wall of the trough and comprises material integral with said liner which extends through one or more apertures through said occlusal wall and interlocks with the side of the occlusal wall opposite the side containing said trough both before and after the teeth of the arch are impressed in said liner material, said joining means further comprising the liner material being directly molded onto said body and extending through said apertures and engaging the opposite side of said occlusal wall while in its undeformed state.

4,955,394

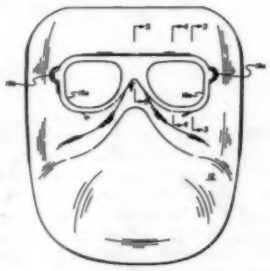
PROTECTIVE FACE SHIELD

Glen R. Dean, 2525 N. 8th St., Suite 109, Grand Junction, Colo. 81501

Filed Jan. 9, 1989, Ser. No. 294,395

Int. Cl.[5] A62B *18/08*

U.S. Cl. 128—863 **12 Claims**



1. A full-face protective shield comprising a very lightweight plastic full-face shield formed from a thin substantially continuous sheet of plastic having a pair of spectacle socket apertures, said shield having facial contours with a concave recess in the rear surface for the nose and curved peripheral edges flared to the rear to fit under the chin and to follow the contour of the forehead and cheeks, said pair of spectacle socket openings in said shield being adjacent the upper portion of the nose recess and sized to fit entirely around the lens rim portion of a spectacle frame to support the shield and to form a substantial seal between the shield and the spectacles so that the shield in conjunction with the lenses of the spectacles covers the eyes, nose, forehead, cheeks, mouth and chin of the wearer with a substantially continuous surface.

4,955,395

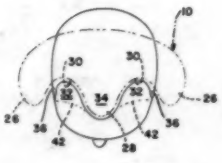
TISSUE EXPANDER AND METHOD OF TREATING MALE TEMPLE BALDNESS

Ernest K. Manders, 1 Timberline Pl., Hummelstown, Pa. 17036

Filed Mar. 8, 1990, Ser. No. 488,165

Int. Cl.[5] A61B *19/00*; A61F *2/02*

U.S. Cl. 128—898 **15 Claims**

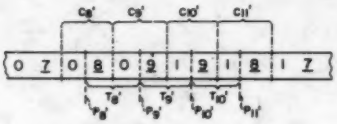


1. A tissue expander including a base, an expandable cover overlying the base and joined to the peripheral edge of the base to define an interior chamber, and port means for inflating the chamber, the base including three spaced arms separated by two recesses.

4,955,396
METHOD FOR TAGGING MACRO-ORGANISMS

Richard D. Fralick, East Sound, and Philip A. Ekstrom, Shaw Island, both of Wash., assignors to Northwest Marine Technology, Inc., Shaw Island, Wash.

Filed Feb. 5, 1988, Ser. No. 152,458
Int. Cl.[5] A61B 17/00
U.S. Cl. 128—898 16 Claims



1. A method for tagging members of a large group of macro-organisms so that each member of the group is assigned to a respective subgroup, comprising the steps of:

providing a continuous length of wire;

indelibly marking said wire along the length thereof with a sequence of separate and distinct identification codes, each of said codes including a respective multidigit numeral with individual digits disposed in a linear array extending in a longitudinal direction along the length of said wire, said identification codes being greater in number than an algebraic number base of the nultidigit numerals, each of the multidigit numberals being flanked on opposite sides in the longitudinal direction by a first multidigit numeral of a first one of said identification codes and by a second multidigit numeral of a second one of said identification codes and having exactly one digit differing in value from a corresponding digit of said first multidigit numeral and exactly one digit differing in value from a corresponding digit of said second multidigit numeral;

successively severing substantially equal length segments from said wire at one end thereof;

storing, for later reference in identifying a macro-organism, a first one of said segments upon a severing thereof from said wire;

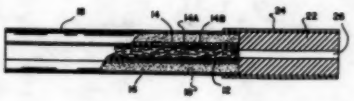
implanting at least a subsequent one of said segments in a respective one of said macro-organisms upon a severing of said subsequent one of said segments from said wire subsequent to the severing of said first one of said segments; and

storing another one of said segments upon a severing thereof from said wire subsequently to the severing of said subsequent one of said segment.

4,955,397
CIGARETTE

Robert R. Johnson, and Jiunn-Yaun Tang, both of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jul. 10, 1989, Ser. No. 378,351
Int. Cl.[5] A24D 3/04; A24B 15/00
U.S. Cl. 131—194 10 Claims



1. A cigarette comprising:

a tobacco rod;

a metallic wrapper circumscribing the tobacco rod;

a cylinder of carbon fuel surrounding the metallic wrapped tobacco rod;

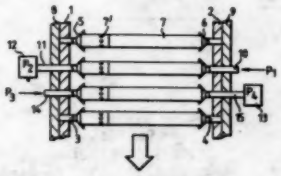
an air permeable wrapper circumscribing the cylinder of carbon fuel; and,

a filter plug coaxially located at one end of the tobacco rod and surrounding cylinder of carbon fuel, the filter plug having a cylindrical passageway therethrough in longitudinal alignment with the tobacco rod, said carbon fuel in flow communication with said filter plug.

4,955,398
RELATING TO THE MONITORING OF ROD-LIKE ARTICLES

John K. Milner, Horton, and Roger B. Dagnall, Milford-on-Sea, both of England, assignors to British-American Tobacco Company Limited, London, England

Filed May 4, 1982, Ser. No. 374,634
Claims priority, application United Kingdom, May 13, 1981, 8114553
Int. Cl.[5] A24B 5/60
U.S. Cl. 131—280 11 Claims

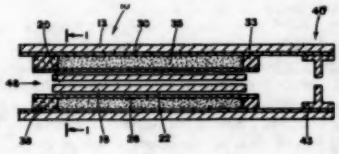


1. A method of monitoring a succession of rod-like articles, wherein one or more flow regimes is established in each rod-like article in order to determine the relationship which the upstream and downstream equivalent gas flow resistances of the article bear to each other, and detection is made of variations in the relationship indicative of the position of out-of-specification gas flows.

4,955,399
SMOKING ARTICLE

Dennis L. Potter, Kernersville; Mark L. Raker, Clemmons; Henry T. Ridings, Lewisville; Andrew J. Sensabaugh, Jr., Winston-Salem; Amos E. Westmoreland, Winston-Salem; Woods, Donna K., Winston-Salem, and Chandra K. Banerjee, Pfafftown, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Nov. 30, 1988, Ser. No. 277,730
Int. Cl.[5] A24D 1/00, 1/02, 1/18
U.S. Cl. 131—359 84 Claims



1. A cigarette which does not burn tobacco comprising: (a) tobacco; and

(b) a physically separate, non-combustion heat source for heating but not burning the tobacco, and including

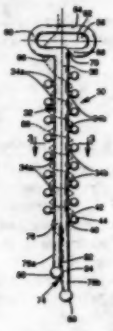
(i) a first chemical agent capable of interacting exothermically with a second chemical agent, and a third chemical agent capable of interacting exothermically with the first chemical agent, and

(ii) a dispersing agent for the first agent.

4,955,400
WIGS
Masakatsu Takahashi, 4-6, Narihira-cho, Ashiya-shi, Hyogo-ken, Japan
Continuation of Ser. No. 52,599, May 19, 1987, abandoned. This application Oct. 19, 1989, Ser. No. 423,733
Claims priority, application Japan, May 19, 1986, 61-115731
Int. Cl.[5] A41G 5/00
U.S. Cl. 132—56 8 Claims

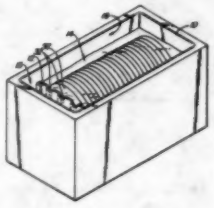
1. A wig characterized in that said wig is constructed by forming fiber filaments by coating fibers selected from the group consisting of synthetic fibers, natural fibers, natural hair and regenerated fibers with a powder of inorganic substance with excellent heat releasing characteristics during the manufacturing process of said fibers and then composing said fiber filaments into an artificial scalp portion and artificial hair as components of said wig.

4,955,401
HAIR CURLER
Sandra M. Parsons, 4119 NE. 132nd Pl., Portland, Oreg. 97230
Filed Nov. 29, 1989, Ser. No. 442,904
Int. Cl.[5] A45D 2/14
U.S. Cl. 132—262 19 Claims



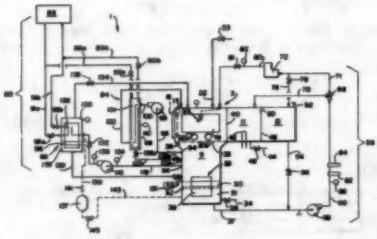
1. A hair curler, comprising:
a rod having first and second ends and a length along which plural radially projecting cylindrical posts of uniform length are positioned alternately on opposite sides of the rod, the posts along each of the opposite sides of the being spaced apart by a uniform distance such that a post on one side of the rod bisects the rod distance between an adjacent pair of posts on the opposite side of the rod;
an eyelet positioned at the first end of the rod and formed by a substantially elliptical loop defined by a major axis that is substantially perpendicular to the length of the rod, the loop being closed on one side of the rod and having a flexible finger on an opposite side of the rod to form an inlet for receiving a base end of a strand of hair to be wrapped around the curler; and
clip means positioned at the second end of the rod for securing to the curler a distal end of the strand of hair, the clip means including second and third opposed flexible fingers that extend along the longitudinal axis.

4,955,402
CONSTANT BATH SYSTEM WITH WEIR
Henry R. Miranda, Milpitas, Calif., assignor to P.C.T. Systems, Inc., Milpitas, Calif.
Filed Mar. 13, 1989, Ser. No. 322,586
Int. Cl.[5] B08B 3/04
U.S. Cl. 134—107 14 Claims



1. A system for bathing at least one object in a liquid at a constant temperature comprising:
a rectangular container for holding said liquid, said container having an open top side;
a removable dividing means comprises a flat plate having edges shaped for engaging the sides of said container and separating said container into first and second regions, said first region receiving said object in said liquid and said second region receiving said liquid from said first region, said dividing means having a scalloped top edge;
means for removing said liquid from said second region and filling said first region with said removed liquid;
means for filtering said removed liquid;
means for heating said liquid to maintain said liquid at a constant temperature;
whereby said liquid overflows said dividing means top edge from said first region into said second region when said system is in operation.

4,955,403
CLOSED LOOP SYSTEM AND METHOD FOR CLEANING ARTICLES WITH A VOLATILE CLEANING SOLVENT
Donald E. Zappa, Pittsburgh, Pa., and James J. Cascone, Voorhees, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Nov. 30, 1988, Ser. No. 277,847
Int. Cl.[5] B08B 3/10
U.S. Cl. 134—109 24 Claims



11. A closed system for cleaning articles by means of a volatile cleaning solvent, comprising:
a cleaning chamber having a doorway means for allowing access to the interior of the chamber and for sealing the chamber interior from the ambient atmosphere;
a nozzle means disposed within said chamber for selectively

discharging vaporized and atomized volatile cleaning solvent on an article within said chamber incident to a cleaning operation;

a closed loop solvent condenser system for liquefying vaporized and atomized cleaning solvent at the same rate that said nozzle means discharges said vaporized and atomized solvent including a vaporized solvent condenser assembly having a heat exchanger, a housing that encloses the heat exchanger and serves as an air reservoir, inlet and outlet conduits connected between said housing and said chamber, and a vacuum pump means for circulating the air within said cleaning chamber through said heat exchanger in order to remove vaporized solvent therefrom and for creating a negative pressure in said chamber and a positive pressure in said housing when said nozzle means discharges solvent, and

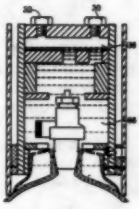
a solvent sump for collecting liquid solvent from said cleaning chamber, wherein said sump includes a quantity of isolating fluid for forming a film over the top surface of the collected solvent that isolates the collected solvent from the ambient atmosphere when said chamber doorway means is opened.

4,955,404

METHOD AND APPARATUS FOR SEALING LEAKING VALVES ON COMPRESSED GAS TANKS

Terry Pitzen, La Mesa, Calif., assignor to Gaslock Corporation, La Mesa, Calif.

Filed Jan. 24, 1990, Ser. No. 469,189
Int. Cl.[5] F16K *13/10, 51/00*
U.S. Cl. 137—15 **15 Claims**



1. A method of sealing a leaking valve on a compressed gas tank for safe transport of the tank and valve to a repair depot, comprising the steps of:

placing a cap over the valve and attaching the cap to the tank,

filling the cap through a fill opening with a fusible substance in liquified form,

venting the cap via a vent opening during filling,

sealing off the fill and vent openings,

causing the fusible substance to solidify within the cap and around the valve to encapsulate the valve in the solidified fusible substance,

transporting the tank and valve with the associated cap and solidified fusible substance to a repair depot,

at the repair depot, liquifying the fusible substance and draining it from the cap, and

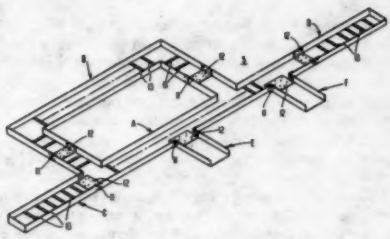
removing the cap from the tank to accommodate access to and servicing of the valve.

4,955,405

PREFABRICATED CAR WASH DISTRIBUTION AND DELIVERY SYSTEM AND METHOD

Dennis Glick, Media; Nicholas Vale, Exton; Michael McDade, Oxford, and Richard Vogel, West Grove, all of Pa., assignors to White Glove, Inc., Radnor, Pa.

Continuation of Ser. No. 213,850, Jun. 30, 1988. This application Jan. 26, 1990, Ser. No. 471,049
Int. Cl.[5] B60S *3/04;* F16L *5/00*
U.S. Cl. 137—234.6 **13 Claims**



1. A system for the distribution and delivery of supplies to car wash equipment through delivery lines in a car wash tunnel comprising:

a raceway carrying said delivery lines;

means for mounting said raceway in the tunnel;

a distribution rack mounted in a separate mechanical room;

an opening between said tunnel and said mechanical room for receiving supply lines between said raceway and rack;

means for coupling supply lines to said equipment and rack to deliver substantially all desired supplies to said car wash equipment;

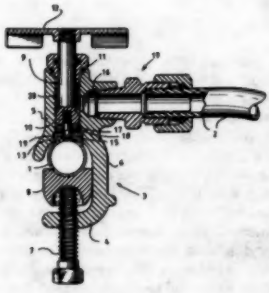
said delivery lines being connected to said car wash equipment.

4,955,406

CONNECTOR FOR WATER PIPES

Frank Antoniello, Commack, N.Y., assignor to I.W. Industries, New York, N.Y.

Filed Apr. 20, 1989, Ser. No. 340,792
Int. Cl.[5] F16K *43/00, 31/50;* F16L *55/10*
U.S. Cl. 137—318 **1 Claim**



1. A connector for establishing a communication between an existing water pipe and an additional water conduit, the connector comprising:

a C-shaped clamp valve housing member arranged to clamp an existing water pipe and an adjustable clamping means cooperating with said clamp housing;

a valve arranged to pierce the said water pipe and to establish a communication between the latter and an additional

water conduit, said valve including a valving piercing means cooperating with said valve housing, said clamp housing and said valve housing being formed integrally of one piece with one another so as to form an integral one piece housing unit;

a seal guide means disposed on said valving means for threadably plugging in upper portion of said valve housing and sealably guiding said valving means therein to control the piercing of said water pipe;

said housing having a bottom portion, said adjustable means including a threaded element received in said bottom portion;

an upstanding wall portion extending from said bottom portion to said upper portion of said valve housing on one side thereof and a downwardly projecting wall portion that protrudes over a portion of said water pipe to retain said water pipe and leaving an open portion between the bottom portion and the wall protrusion, said open portion permitting easy access for removal of said water pipe without disassembling said valve housing and said valve piercing member;

said adjustable clamping means including a threaded element received in said bottom portion, a support element disposed within said housing for supporting said water pipe, said support element having a recess for receiving said threaded element for adjustably moving said support element toward said piercing means and to adapt to different water pipe sizes.

4,955,407

CHECK VALVE INSERTABLE INTO A HOSE

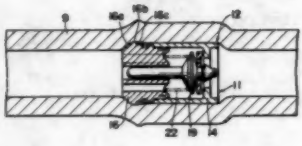
Yoshimichi Inoue, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 315,445

Claims priority, application Japan, Mar. 8, 1988, 63-30698[U]; Mar. 25, 1988, 63-39365[U]

Int. Cl.[5] F16K *15/06*

U.S. Cl. 137—454.2 **1 Claim**



1. A check valve assembly insertable into the interior of a flexible hose, comprising: a valve body portion having one of an inlet port and an outlet port; and, a valve end piece having a port other than said one of an inlet port and an outlet port of said valve body portion, said valve body portion and said valve end piece being jointed together to embody said valve body means, said valve body portion having an internal surface with an internal large-diametrical portion and an internal small-diametrical portion forming a step or shouldered portion between said internal large-diametrical portion and internal small-diametrical portion, said valve end piece having an external large-diametrical portion and an external small-diametrical portion forming a valve end piece shouldered portion between said external large-diametrical portion and external small-diametrical portion, each of said external large-diametrical portion and said external small-diametrical portion and said external small-diametrical portion of said valve body portion, respectively, each of said shoulder portions defining a joint surface, said valve end piece having grooves formed at each side of said joint surface extending in a circumferential direction providing a reduction in the external diameter of said external large-diametrical portion and said external small-diametrical portion.

4,955,408

VACUUM-CONTROL VALVE FOR MILKING SYSTEMS

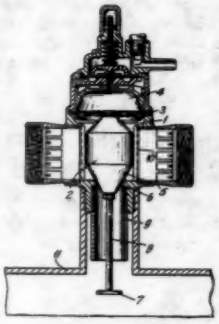
Theodor Meermoller, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,458

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827368

Int. Cl.[5] G05D *16/06*

U.S. Cl. 137—470 **9 Claims**



1. In a vacuum-control valve for milking systems, comprising an upright valve body having a conical projection extending into an air-intake, wherein the valve body is mounted for axial movement from a lower position wherein the air-intake is closed and an upper position wherein the air intake communicates with a vacuumized line and wherein the valve-body cross-section changes as it moves axially, the improvement comprising a rod extending below the valve body, an aerodynamic structure connected to the rod under the valve body and positioned to effect a downward force on the valve body in response to air entering the air-intake and an air-channeling tube downstream of the air intake, wherein the air-channeling tube terminates above the aerodynamic structure.

4,955,409

FUEL SUPPLY SYSTEM

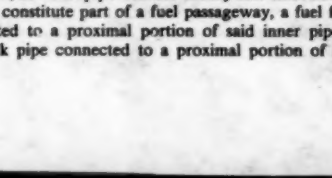
Teruhiko Tokuda, Kosai; Koji Ishihara, Hamamatsu; Masahiko Maruyama, and Manabu Wada, both of Kamimura, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Apr. 18, 1989, Ser. No. 339,653

Claims priority, application Japan, Apr. 18, 1988, 63-95024

Int. Cl.[5] F02M *55/02*

U.S. Cl. 137—561 A **2 Claims**



1. A fuel supply system comprising: a fuel delivery pipe for distributing fuels to injectors corresponding to respective cylinders, an inner pipe inserted fixedly into said fuel delivery pipe to constitute part of a fuel passageway, a fuel feed pipe connected to a proximal portion of said inner pipe, a fuel feedback pipe connected to a proximal portion of said fuel

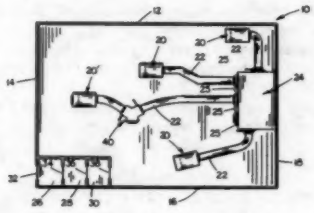
delivery pipe and disposed closely adjacent to said fuel feed pipe and to the proximal portion of the inner pipe, and at least one opening disposed on the end portion of the inner pipe opposite to the proximal portion thereof to communicate with the fuel delivery pipe, whereby the closely adjacent spacing of said fuel feed pipe and said fuel feedback pipe at the proximal portion of said inner pipe and said fuel delivery pipe minimizes obstacles to the flow of fuel within said fuel delivery pipe and shortens the connections between said fuel feed and feedback pipes and fuel pipes connected to the fuel tank.

4,955,410

METHOD AND MEANS FOR REPLACING A MALFUNCTIONING AIR FILTRATION UNIT

Steven C. Griffis, 2929 Avenue D, Council Bluffs, Iowa 51501

Division of Ser. No. 308,749, Feb. 10, 1989, Pat. No. 4,859,221.
This application Jun. 5, 1989, Ser. No. 361,999
Int. Cl.[5] F16K *11/10*
U.S. Cl. 139—883 **4 Claims**



1. In combination,
a malfunctioning air filtration unit located in a contaminated area and having its exhaust normally connected to a first air conduit which extends to a selectively closable air exhaust means,
a Y-shaped air diverter box means having an interior compartment and at least first, second and third openings communicating therewith, said first opening being selectively connected to said first air conduit,
a second air conduit for selective connection to said second opening,
a third air conduit for selective connection to said third opening,
said box means having a selectively movable valve member imposed in each of said first, second and third openings whereby air from said first, second or third conduits may be selectively introduced into the interior of said box means or passed outwardly therethrough.

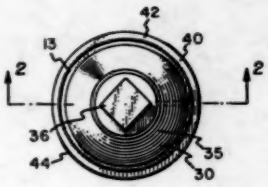
4,955,411

HOSE HAVING INDEX MARK

Roy W. Olsen, and Curtis H. Bell, both of Lincoln, Nebr., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 543,583, Oct. 19, 1983, abandoned, which is a division of Ser. No. 299,286, Sep. 4, 1981, Pat. No. 4,435,352. This application Sep. 9, 1985, Ser. No. 774,175
Int. Cl.[5] F16L *35/00*
U.S. Cl. 138—109 **1 Claim**

1. An axially elongated hose, for connecting a nipple on an automotive engine to a nipple on a radiator, including a composite wall having at least one layer of elastomer material and an embedded reinforcement layer of filamentary material extending throughout the length and circumference of the hose, said wall having its at least one layer of elastomer material cured with its axis in a plurally curved formation, said wall having a single small hole extending through said cured at least one layer of elastomer material and said embedded reinforcement layer at or adjacent to end of the hose into which a nipple



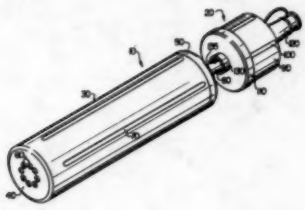
having an index mark is to be inserted with the mark registering with the hole.

4,955,412

APPARATUS FOR INJECTING CONFETTI INTO A BALLOON

Donna Younts, and Eileen Yeung, both of Hong Kong, Hong Kong, assignors to Continental American Corporation, Wichita, Kans.

Filed Mar. 29, 1989, Ser. No. 330,109
Int. Cl.[5] B65B *3/16*
U.S. Cl. 141—114 **10 Claims**



1. An apparatus for simultaneously injecting confetti and air into a balloon comprising:
an air pump for providing a flow of air;
a container for storing confetti;
inlet means on said container for securing the container to the air pump for receiving the flow of air therefrom outlet means on said container for attaching a balloon to the container; and said container including air flow guide means for guiding a mixture of air and confetti into said balloon.

4,955,413

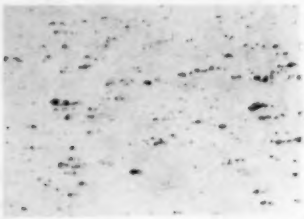
AL ALLOY PRODUCT CONTAINING LI, RESISTANCE TO CORROSION UNDER STRESS, AND PROCESS TO OBTAIN SAID PRODUCT

Philippe Meyer, Voiron, and Bruno Dubost, St. Egréve, both of France, assignors to Cegedur Societe de Transformation de l'Aluminum Pechiney, Paris, France

Filed Feb. 17, 1988, Ser. No. 156,595
Claims priority, application France, Feb. 18, 1987, 87 02719; Jan. 20, 1988, 88 01005
Int. Cl.[5] C22F *1/04*
U.S. Cl. 148—12.7 A **18 Claims**

10. Process for the manufacture of Al alloys containing Li and optionally Cu, Mg, Zn, Zr, Mn, Cr, Nb, Ni, Fe and Si, allowing them to be densensitized to corrosion under stress comprising the steps of hot shaping of a cast or wrought product, optionally cold-working, incompletely solution annealing, quenching, optionally controlled cold-working and tempering,

wherein the incomplete solution annealing is carried out in a temperature range of between 460° C. and T_M (°



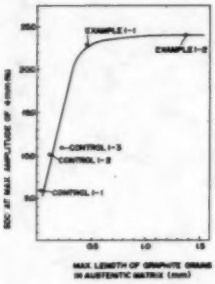
C.)=474+18.2(% Li)—2(% Cu) (% Cu—1.7)+(% Mg) (−17.6+3.6(% Li)+4.3(% Cu))−3(% Zn).

4,955,414

BEARING HAVING A VALVE SEAT FOR A ROTARY COMPRESSOR

Eiichiro Fujii, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 10, 1989, Ser. No. 349,858
Claims priority, application Japan, May 24, 1988, 63-126511
Int. Cl.[5] C22C *38/36*
U.S. Cl. 148—324 **2 Claims**



1. A bearing having a valve seat, for a rotary compressor which is made of austenitic cast iron with graphite crystallized in an austenite matrix in the form of an A type, C type, or A/C combined type under the ISO classification, the crystallized graphite having a maximum length of 1.4 mm, that portion having a length of 0.45 to 1.4 mm comprising 15 to 30% by volume of the crystallized graphite.

4,955,415

PNEUMATIC RADIAL TIRE WITH GROOVE PLATFORMS TO PREVENT STONE ENTRAPMENT

Akihiro Takeuchi, and Toshio Koyama, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Continuation-in-part of Ser. No. 905,153, Sep. 9, 1986, abandoned. This application May 13, 1988, Ser. No. 193,762
Claims priority, application Japan, Sep. 10, 1985, 60-201401
Int. Cl.[5] B60C *11/06*
U.S. Cl. 152—209 R **2 Claims**

1. A pneumatic radial tire having a tread provided with a central longitudinal groove on the central part thereof, side longitudinal grooves disposed on both sides of said central longitudinal groove, and lateral grooves connecting the central longitudinal groove with said side longitudinal grooves;

said central longitudinal groove extending continuously zigzag in the circumferential direction of the tire along the equator of the tire to form a plurality of zigzag angled portions of the central longitudinal groove, each angled portion of the central longitudinal groove provided with a platform formed on only one side of the groove sidewalls at the protruding point of the zigzag angled portion, said lateral grooves connecting the other side of the groove sidewalls of the central longitudinal groove opposite said platform with said side longitudinal grooves;

the depth of the platform from the tread surface to the platform being in a range of 40 to 80% of the depth of the central longitudinal groove;

the circumferential length of the platform being in a range of 15 to 40% of the zigzag pitch of the central longitudinal groove; and

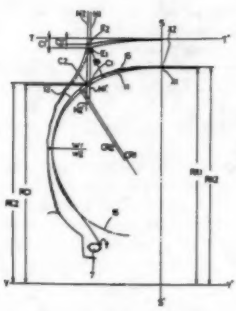
the width of the platform being in a range of 5 to 20% of the width of the central longitudinal groove.

4,955,416

PNEUMATIC RADIAL TIRE CARCASS PROFILE

Akihiro Takeuchi, Kobe; Kouichi Horiuchi, Akashi; Kiyoshi Ochiai, and Hideaki Yoshikawa, both of Kobe, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Japan

Continuation-in-part of Ser. No. 835,783, Mar. 3, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 185,273
Int. Cl.[5] B60C *3/00*
U.S. Cl. 152—454 **10 Claims**



1. A pneumatic radial tire constructed to increase tread lateral stiffness, comprising;

a tread with a radially outer profile curved in a plane including the tire axis;

a carcass reinforced by at least one carcass ply of substantially radially arranged unstretchable parallel cords, and said carcass having carcass shoulders radially inside both ends of said tread;

a belt, disposed between the carcass and the tread, and comprising at least two plies of parallel cords arranged at a comparatively small degree of angle with respect to the circumferential direction of the tire to cross the cords of each ply with the cords of the next ply so that when the tire is mounted on a rim officially specified for use with said tire and inflated to specified maximum pressure, said

carcass shoulders move radially outwardly and a carcass center therebetween does not move substantially;

in which said tread profile increases in radius of curvature by the outward movement of the carcass shoulders upon increase in the air pressure, and the radius of curvature of said tread profile satisfies the following relation:

$$1.2 \leq TR2/TR1 \leq 1.5$$

where TR1 is the radius of curvature when the tire is inflated to 5% pressure of the specified maximum pressure, and TR2 is the radius of curvature when inflated to the specified maximum pressure,

whereby a compressive strain in the axial direction of the tire is caused to occur in the tread and its lateral stiffness is increased.

4,955,417

LOW PRESSURE TIRE

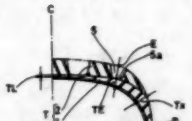
Yasuo Igarashi, Kawanishi, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jun. 21, 1988, Ser. No. 210,413

Claims priority, application Japan, Jun. 23, 1987, 62-156988

Int. Cl.[5] B60C *3/00*

U.S. Cl. 152—454 **2 Claims**



1. A low presure tire comprising:

a rubber main body comprising a pair of bead portions having a bead core, a crown portion and a pair of sidewall portions extending therebetween;

a rubber tread disposed on the crown portion of the rubber main body, said rubber tread having tread grooves; and

a carcass of cords provided on an inner surface of the rubber main body and extending between the bead portions,

thickness of rubber in the tire being defined as a distance from the carcass ply to a level of the tread groove bottom in a range in which said rubber tread is disposed on the rubber main body and defined, in the remaining range, as a distance from the carcass ply to the outer surface of the main body, the thickness being a maximum of 4 to 9 mm at a point between a tread edge and a maximum tire width section,

the rubber thickness being gradually decreased from the maximum rubber thickness points toward the tire equator and towards the respective maximum tire width section,

the rubber thickness at the tread edge being 1/1.3 to 1/3.5 times the maximum rubber thickness,

the rubber thickness at the maximum tire width section being 1/1.1 to 1/2.5 times the maximum rubber thickness.

4,955,418

PNEUMATIC VEHICLE TIRE

Johannes J. Baumhöfer, Aachen, Fed. Rep. of Germany, assignor to Uniroyal Englebert Reifen GmbH, Aachen, Fed. Rep. of Germany

Filed Mar. 10, 1989, Ser. No. 321,953

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 8803348[U]

Int. Cl.[5] B60C *15/00*

U.S. Cl. 152—539 **3 Claims**

1. In a pneumatic vehicle tire having tire beads comprising a rubber mixture respectively elastomeric material, with each bead being provided with a bead ring that is resistant to pressure and bending and said bead ring is in the form of a steel cable comprised of a cable core wire and a plurality of cable sheathing-wires that impart a circular shape to said bead ring cable, and said bead ring cable is able to pivot slightly in said bead, and with said tire including a carcass that is anchored in said bead on said bead ring cable and said carcass is provided with a coating of elastomeric material, the improvement wherein:

each of said cable sheathing-wires of said bead ring cable has an outer surface that is in contact with elastomeric material in said tire bead, with each of said cable sheathing-wires of said bead ring cable being pivotable in relation to said elastomeric material when the same is vulcanized so that positioning thereof is fixed prior to and during vulcanization of the tire during mounting of which on a rim consequently a necessary slight ability of the bead ring to pivot is assured due to both torsional resilience of the steel cable and also the elastomeric material in contact with the outer surface of each of said cable sheathing-wires is substantially unbonded to said bead ring cable.

4,955,419

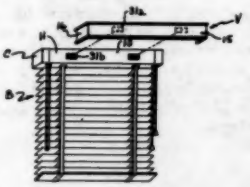
FOLDABLE VALANCE

John F. Morris, Lake Mills, Wis., assignor to Graber Industries, Inc., Middleton, Wis.

Filed Sep. 22, 1989, Ser. No. 410,839

Int. Cl.[5] E06B *9/00*

U.S. Cl. 160—38 **8 Claims**



1. A foldable valance for a headrail having a front and ends, the valance including an elongated front panel and at least one return panel, the front panel and return panels each having an inner and an outer side face and end faces adapted to abut when the inner side face of the return panel extends generally perpendicular to the inner side face of the front panel, a one-piece hinge formed of flexible plastic and including first and

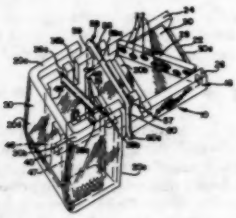
second plate portions and an integral hinge portion flexibly connecting the first and second plate portions, means attaching the first plate portion to the inner side face of the front panel and means attaching the second plate portion to the inner side face of the return panel to hingedly connect the front and return panels for movement between a folded position in which the inner side face of the return panel extends alongside the inner side face of the front panel and an erected position in which the inner side face of the return panel extends transverse to the inner side face of the front panel, the one-piece hinge including a tab integral with the second plate portion of the hinge and bendable from a normal position disposed generally in the plane of the second plate portion to a position extending transverse to the second plate portion for retaining the return panel in the erected position with the end faces of the front and return panels in abutting relation.

4,955,420

CORD LOCKING MECHANISM

Florin Marinescu, Tega Cay, S.C.; Bakulesh N. Patel, Charlotte, N.C., and William M. Hammond, Irvine, Calif., assignors to CHF Industries, Inc., Charlotte, N.C.

Filed Oct. 17, 1989, Ser. No. 422,524
Int. Cl.[5] E06B *9/324*
U.S. Cl. 160—178.2 **12 Claims**



1. A locking mechanism for a plurality of cords of a window blind or the like and into which the cords extend in a substantially horizontal direction and from which the cords extend in a substantially vertical direction, said mechanism comprising cord separating means for separating the cords substantially horizontally as they enter said mechanism, said cord separating means including an obliquely disposed separation member having an integral base and upper portion, said upper portion having a plurality of separate holes therethrough, each hole for accommodating a single cord, oblique guide means positioned outwardly from said cord separating means and over which the cords extend substantially horizontally and from which the cords extend substantially vertically, cord gripping means positioned below said guide means and including first and second gripping members for receiving the cords therebetween, at least one of said gripping members being selectively movable toward the other gripping member to grip the cords and prevent vertical upward movement of the cords therebetween and movable away from the other gripping member to release the cords and permit vertical upward movement of the cords therebetween.

4,955,421

CONTINUOUS CORD ROLL UP BLIND

Anthony Torti, Warwick, R.I., assignor to Kenney Manufacturing Company, Warwick, R.I.

Filed Aug. 31, 1989, Ser. No. 401,083
Int. Cl.[5] A47H *1/00*
U.S. Cl. 160—243 **8 Claims**

1. A continuous cord roll up apparatus comprising:

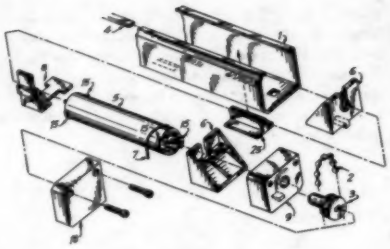
a headrail;

a sprocket rotatably connected at one end of said headrail;

an endless cord in engagement with said sprocket for rotating said sprocket;

a take up spool rotatably connected to said sprocket and comprising a tab portion associated therewith;

a take up cord connected at one end to said take up spool and extending below said headrail and back up to and connected to said headrail; and



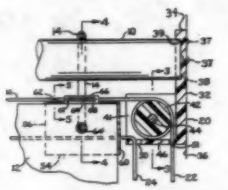
a generally L-shaped take up cord guide having a generally horizontal leg and a generally vertical leg slidably located between said take up spool and said headrail for interacting with said tab portion of said take up spool to prevent further rotation of said take up spool in one direction when said generally L-shaped take up cord guide is adjacent one end of said take up spool.

4,955,422

SHOWER CURTAIN OPERATOR

Guillermo Irizarry, 910 Briarcliff Dr., Valrico, Fla. 33594

Filed Jul. 13, 1989, Ser. No. 379,263
Int. Cl.[5] A47H *5/00*
U.S. Cl. 160—344 **3 Claims**



1. In combination with a shower curtain assembly that includes a horizontal rod, a flexible shower curtain located below said rod, and a series of suspension rings extending over the rod and through openings in the curtain, to thereby suspend the curtain from the rod;

the improvement comprising means for opening and closing the curtain without manual gripment of the curtain material; said opening-closing means comprising a flexible pull cord having horizontal cord sections running along the upper edge of the flexible curtain, means at each end of the horizontal rod for guiding and redirecting the pull cord, and means for attaching said cord to an upper corner of the curtain;

each said guiding-redirecting means comprising a bracket structure adapted to seat against a bathroom wall surface between said surface and the associated end of the shower curtain rod, and a horizontal axis pulley rotatably mounted on each said bracket structure directly below the curtain rod;

said cord-curtain attaching means comprising a U-shaped plate structure formed entirely of plastic; said U-shaped plate structure comprising two spaced parallel vertical

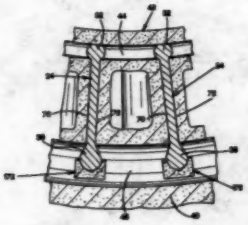
plates having upper edges thereof elevated slightly above the upper edge of the shower curtain, and a resilient integral hook extending from one plate across the upper edge of the other plate to maintain the two plates clamped against opposite faces of the curtain; said cord-curtain attaching means further including a horizontally elongated apertured lug projecting upwardly from the U-shaped plate structure, said lug having two cord-receiver apertures extending therethrough to attach the plate structure to the cord; said cord-receiver apertures being horizontally spaced along the upper edge of the curtain so that the attached cord section maintains a horizontal orientation along the curtain upper edge.

4,955,423

METHOD OF MAKING A TURBINE ENGINE COMPONENT

William S. Blazek, Valley City, Ohio, assignor to PCC Airfoils, Inc., Cleveland, Ohio

Filed Jan. 25, 1989, Ser. No. 301,867
Int. Cl.[5] B22C 9/04
U.S. Cl. 164—35 **82 Claims**



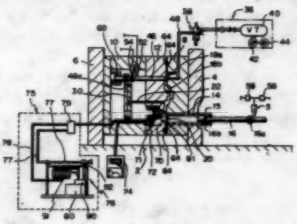
1. A method of making a turbine engine component having a plurality of airfoils disposed in an annular array between shroud rings, said method comprising the steps of positioning a plurality of airfoils in an annular array with end portions of the airfoils at least partially enclosed in a shroud ring pattern and with core material disposed at end portions of the airfoils, the core material being at least partially enclosed by material of the shroud ring pattern, at least partially covering the shroud ring pattern and core material with ceramic mold material to form a mold, removing the shroud ring pattern from the mold to leave a shroud ring mold cavity, the end portions of the airfoils and the core material being at least partially disposed in the shroud ring mold cavity, filling the shroud ring mold cavity with molten metal, said step of filling the shroud ring mold cavity with molten metal including the steps of at least partially enclosing the end portions of the airfoils and the core material with a body of molten metal having a configuration corresponding to the configuration of the shroud ring, solidifying the molten metal in the shroud ring mold cavity to form the shroud ring, said step of solidifying the molten metal including solidifying the molten metal in the shroud ring mold cavity with the core material at least partially disposed in the shroud ring mold cavity, and removing the core material from the shroud ring to leave space in the shroud ring to accommodate thermal expansion of the airfoils.

4,955,424

DIE-CASTING METHOD AND DEVICE

Fumitaka Takehisa, Anjo; Fumio Kondoh, Nagoya, and Mitsuyoshi Yokoi, Takahama, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 160,987, Feb. 26, 1988, abandoned. This application Aug. 9, 1989, Ser. No. 391,393
Claims priority, application Japan, Feb. 28, 1987, 62-45824; Dec. 23, 1987, 62-326560; Jan. 20, 1988, 63-11582
Int. Cl.[5] B22D 17/00
U.S. Cl. 164—72 **23 Claims**



1. A die-casting method using a first mold having a mold cavity surface, a second mold having a mold cavity surface and brought into contact with said first mold so that said mold cavity surfaces of said first and second molds define a mold cavity, means for injecting a molten metal into said mold cavity, means for ejecting from said mold cavity a solidified article made by allowing said molten metal to solidify, and a heating device heating a lubricant, said method comprising the steps of:

forming said mold cavity by bringing said second mold into contact with said first mold;

heating said lubricant to a temperature higher than a temperature of said mold cavity surfaces of said first and second molds before said molten metal is injected into said mold cavity, so that said lubricant is decomposed;

then introducing said decomposed lubricant into said mold cavity so that said lubricant is condensed and applied on said mold cavity surfaces of said first and second molds;

injecting said molten metal into said mold cavity;

allowing said molten metal to solidify in said mold cavity;

separating said second mold from said first mold; and

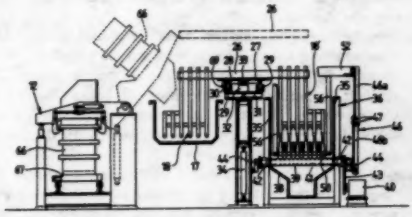
ejecting the solidified article from said mold cavity.

4,955,425

CASTING HANDLING APPARATUS

James F. McKenna, 2605 Chandalar La., Pelham, Ala. 35124

Filed Sep. 19, 1988, Ser. No. 245,504
Int. Cl.[5] B22D 29/00
U.S. Cl. 164—269 **23 Claims**



1. Apparatus for handling hot foundry castings discharged from sand molds, without damage thereto comprising:

(a) means for receiving a foundry casting and a quantity of

encasing sand from an associated sand mold including means pervious to said encasing sand for supporting said foundry casting;

(b) means for vertically moving said means for supporting such that said means for supporting segregates said foundry casting from said sand;

(c) means for translating said means for supporting such that said means for supporting is displaced laterally to a predetermined position including a turntable which is mounted for rotation about a vertical axis with a means for driving said turntable to precise angular positions and also with an elongated beam member affixed to said turntable and extending radially therefrom and having a distal end which is permanently attached to said supporting means; and

(d) means subjacent said displaced position capable of interstitial engagement with said supporting means for removing said foundry casting from said means for supporting.

4,955,426

PRESSING MECHANISM FOR CASTING APPARATUS

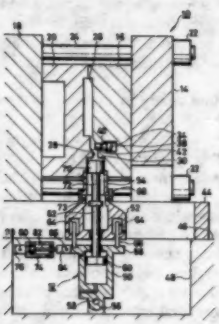
Haruo Akimoto, Yamaguchi, and Kunio Takeya, Tokyo, both of Japan, assignors to Ube Industries, Ltd., Japan

Filed Jul. 11, 1989, Ser. No. 378,164

Claims priority, application Japan, Jul. 26, 1988, 63-184515

Int. Cl.[5] B22D *18/02, 27/11*

U.S. Cl. 164—314 **17 Claims**



1. A pressing mechanism for a casting apparatus, comprising,

a mold including a cavity for solidifying molten metal therein, a runner portion and a biscuit portion for introducing molten metal to the cavity through the runner portion, said runner and biscuit portions being arranged vertically to prevent slag in the molten metal from entering into the runner,

means for supplying molten metal into said cavity, said means having a sleeve for storing molten metal and communicating with said biscuit portion, and a plunger tip situated in said sleeve, said plunger tip being able to protrude from said sleeve so that the molten metal is fed into the mold after the sleeve communicates with the biscuit portion, and

means for feeding molten metal and having a feeding rod disposed in the mold for protruding into the runner portion and means for reciprocating the feeding rod,

wherein the runner has a size of $S_3 \geq P_A/P_B \cdot S_1$, in which S_3 is a sectional area of the runner, P_A is injection pressure by the plunger tip, P_B is feeding pressure by the feeding rod, and S_1 is a sectional area of the plunger tip.

4,955,427

PLACEMENT OF PARTICULATES ONTO REFRACTORY FILTERS FOR LIQUID METALS

Jay R. Hitchings, Downingtown, Pa., assignor to Amenex Associates, Inc., West Chester, Pa.

Filed May 15, 1989, Ser. No. 351,662

Int. Cl.[5] B22C *9/08*

U.S. Cl. 164—358 **2 Claims**

1. In a casting mold, a filter for metallurgically filtering and treating molten metal with particulate additives comprising:

1. a hard fired ceramic or refractory cloth filter, with particulate additives placed on the surface of the filter and encapsulated in a char forming carbonaceous resin coating.

4,955,428

DEVICE FOR CONTINUOUS CASTING OF SLABS

Hans Schrewe, Duesseldorf, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

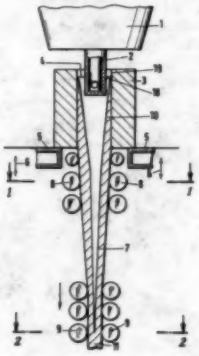
PCT No. PCT/DE87/00370, § 371 Date Feb. 21, 1989, § 102(e) Date Feb. 21, 1989, PCT Pub. No. WO88/01209, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 17, 1987, Ser. No. 331,530

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1986, 3627991

Int. Cl.[5] B22D *11/04, 11/12*

U.S. Cl. 164—417 **2 Claims**



1. Apparatus for continuous casting of slabs with considerably larger width than thickness, particularly of steel slabs with a thickness below 80 mm, including a casting pipe and spout for pouring molten material from a casting vessel into a mold, the mold having a charge and pour-in cross-section, whose middle portion deviates from the desired casting contour in a cross-section increasing fashion, the edge zones of the mold corresponding to the desired casting format the cross-sectional format at the charge and pour-in end of the mold is maintained over the entire mold length, and the casting skin as emerging from the mold is to be deformed in the middle portion by means of guide and support means being arranged directly downstream from the mold such that following passage through the deforming path, the surfaces of the entire casting are situated in the surfaces of the edge zone; the improvement comprising:

the cross-section of the mold in the middle portion of the casting being outwardly uniformly bulged, but a bulge being smaller in a discharge and exit end from the mold, as compared with a larger bulge cross-section at the pour-in and charge end whereby geometric lines delineating a transition from the plane slab surface of the mold to the bulging surface of the mold has a downwardly oriented narrowing tapering and conicity in longitudinal direction

matching a cross-sectional and conicity increase of the bulging portion, but to be not more than 1.2%,

a spacing and distance from an outer periphery of the casting pipe and spout and an apex point of said bulge at the pour-in and charge end in a surface level of the molten material is at least 20 mm;

at least one roll of at least one pair of rolls of the guide and support means downstream from the mold being provided with sizing dimension matching an emerging casting; and

a distance between the rolls of a roller pair from roller pair to roller pair reduces in the direction of casting by at least 0.5 mm, but not more than 25 mm, such that any deformation at the front of solidification does not exceed a value of 0.5%.

4,955,429

APPARATUS FOR AND PROCESS OF DIRECT CASTING OF METAL STRIP

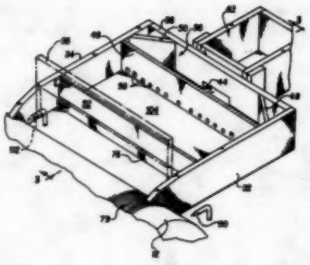
LeRoy Honeycutt, III; James C. Key, and Herbert Moody, III, all of Salisbury, N.C., assignors to Reynolds Metal Company, Richmond, Va.

Continuation-in-part of Ser. No. 179,536, Apr. 8, 1988, Pat. No. 4,828,012. This application Mar. 14, 1989, Ser. No. 323,018

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[5] B22D *11/06*

U.S. Cl. 164—479 **23 Claims**



1. In a process for direct casting of molten metal to form strip by solidification of molten metal on a moving chill surface using a vessel having a floor, spaced sidewalls, an inlet, and an outlet opposite the inlet and extending between the sidewalls for supplying molten metal to the chill surface, the improvement comprising the steps of:

positioning the vessel with the outlet adjacent the chill surface;

providing a source of molten metal to be cast;

withdrawing at least one inlet stream of molten metal from the source and flowing the inlet stream into the vessel through the inlet;

providing a flow obstruction in the vessel in the path of the inlet stream;

utilizing the flow obstruction to divert and distribute the inlet stream to provide a substantially uniform rate of flow of liquid metal through the vessel across its full width downstream of said obstruction means; and

diffusing the molten metal flowing through the vessel downstream of the flow obstruction to provide molten metal at a substantially uniform temperature at the vessel outlet across the full width of the outlet.

10. In a tundish for use in direct casting of metal strip by solidification of molten metal on a moving chill surface, said tundish including a floor, an end wall, a pair of laterally spaced sidewalls, an outlet opposite said end wall and having a transverse discharge surface extending between said sidewalls for flowing a stream of molten metal onto the moving chill surface, means providing a source of molten metal to be cast, and an inlet in said end wall communicating with said source for directing a flow of molten metal from the source into the tundish in a direction toward said outlet, said inlet being located at a level below the level of molten metal in the tundish during casting, the improvement comprising

flow obstructing wall means extending transversely of said tundish between said sidewalls at a location downstream of said send wall,

flow distribution opening means extending through said flow obstructing wall means at a location below the level of molten metal during casting whereby said flow obstructing wall means acts as a skimmer for impurities floating on the molten metal during casting, said opening means being located and dimensioned to provide a submerged flow path for molten metal through said flow distributing wall means at a substantially uniform rate across the width of said tundish between said sidewalls downstream of said flow obstructing wall means, and

flow diffusing means in said tundish downstream of said flow obstructing means, said diffusing means extending upwardly from said bottom wall across the full width of said tundish between said sidewalls and providing a substantially uniform array of openings across the full width of the tundish, said array of openings being dimensioned and located to diffuse the flow of molten metal to provide molten metal at a substantially uniform temperature at the tundish outlet across the full width of the tundish.

4,955,430

CONTINUOUS LEAD-FLOAT CASTING OF STEEL

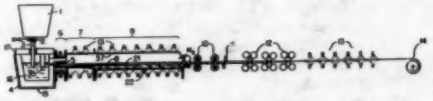
William L. Sherwood, 7249 Cypress Street, Vancouver B.C., Canada V6P 5M2

Continuation of Ser. No. 21,749, Mar. 4, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 309,124

Claims priority, application Canada, Sep. 29, 1986, 519252

Int. Cl.[5] B22D *11/124*

U.S. Cl. 164—485 **25 Claims**



1. A method for the continuous casting of steel comprising:

maintaining a molten lead pool in a lead-holding tray having an entry end, an exit end and an enclosed cover;

maintaining a feed reservoir of liquid steel adjacent said entry end, separated from said molten lead pool by a barrier dam spaced transversely across said entry end separating said pool from said reservoir; allowing continual flow of liquid steel by gravity from said feed reservoir and uniformly distributed between said edge dams by way of at least one passage across said barrier dam to form a top layer of liquid steel floating on the surface of said molten lead pool;

confining either side of said layer of liquid steel between lateral edge dams immersed in said pool and intersecting with said barrier dam, adapted to limit the width of said layer of steel;

continually removing heat from said pool and layer of steel by means of cooling media directly applied to the bottom of said tray; maintaining a solidification front of cohesive solidified steel at a transition between all liquid steel and partially solidified steel slab spanning the width of said pool between said lateral edge dams, by increasing the heat flux from the steel through the lead pool to the tray and cooling media by means of a substantial decrease of molten lead pool depth; continually removing heat from the top of said layer of steel by means of cooling media directly applied to said enclosed cover which, combined

with said cooling of said tray, thereby forms a solidified steel slab by progressive freezing of said layer of steel as it passes from said entry end towards said exit end;

continually replenishing said feed reservoir with infeed of new liquid steel; and

continually withdrawing said slab away from the exit end of said molten lead pool to make space for additional liquid steel at said entry end thereby maintaining a continuous layer of progressively solidifying steel moving from said entry towards said exit end of said molten lead pool during the course of casting.

12. An apparatus for continuous casting of steel comprising:

lead-holding tray means having an entry end and an exit end adapted for holding a molten lead pool and allowing a layer of steel to float on the surface of the lead;

edge dam means immersed longitudinally in said pool at least to the maximum depth of said steel adapted to limit the width of said layer of steel;

a width distributor launder at said entry end adapted for maintaining a continually replenished reservoir of liquid steel ready for casting; dividing dam means separating said reservoir and said molten lead pool extending transversely across the pool to connect with the entry end of said edge dam means, and adapted for feeding of liquid steel directly into said layer without direct impingement of liquid steel upon said molten lead pool during said feeding.,

cover means enclosing the top of said lead-holding tray; heat removal means by direct cooling applied to the bottom surface of said tray means and top surface of said cover means, adapted for extracting heat from said pool and layer of steel and effecting solidification of said steel intermediate said entry and exit end to form a steel slab having at least its entire surface perimeter solidified; slab withdrawal means adapted for continually withdrawing said steel slab from said exit end;

said lead-holding tray comprises three principal areas:

(1) a feed settling area at the entry end subjected to moderate and restrained heat removal adapted to provide a non-turbulent layer of floating liquid steel across the casting width;

(2) an intermediate liquid-solid solidification front area subjected to intense cooling adapted for rapidly effecting a solidification front of cohesive solidified steel shell spanning between said edge dams, with sharply reduced lead pool depth;

(3) a partially-solid slab cooling and solidification area subjected to moderate cooling adapted to substantially complete the interior solidification of the steel slab with moderate pool depth.

4,955,431

COOLING DEVICE FOR AN INTERNAL COMBUSTION ENGINE AND METHOD FOR CONTROLLING SUCH A COOLING DEVICE

Roland Saur, Stuttgart, and Rolf Schaper, Ditzingen, both of Fed. Rep. of Germany, assignors to Behr-Thomson Dehnstoffregler GmbH, Kornwestheim, Fed. Rep. of Germany

Filed Feb. 11, 1988, Ser. No. 155,118

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1987, 3711392

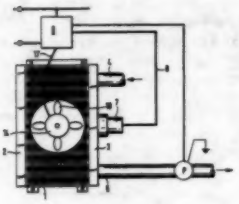
Int. Cl.[5] F01P *7/04*; G05D *23/02, 23/24*

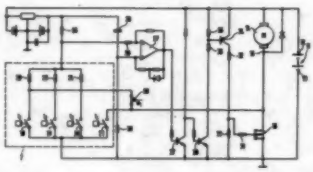
U.S. Cl. 165—1 **18 Claims**

15. A method for controlling a cooling device for an internal combustion engine, said method comprising the steps of:

successively switching contacts of a temperature sensitive sensor of a control circuit for said cooling device when predetermined switching thresholds are reached to change an input parameter to a non-inverting input of an operational amplifier provided in said control circuit;

driving a power semiconductor device included in said control circuit with an output of said operational amplifier in such a manner that an electric motor connected to said semiconductor device coupled to at least one of a fan and cooling water pump is operated at certain rotational speeds allocated in steps to respective switching thresholds, and





bypassing said power semiconductor device to drive said electric motor when a last switching contact closes by connecting said electric motor directly to said last switching contact.

4,955,432

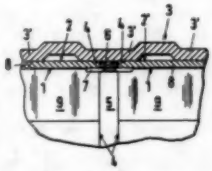
HOT GAS FLUE PIPE

Hans Viessmann, Im Hain, D-3559 Battenberg/Eder, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 331,631

Int. Cl.[5] F28F *21/08*

U.S. Cl. 165—81 **8 Claims**



1. A hot gas flue pipe assembly suitable for installation inside a heating boiler, said hot gas flue pipe assembly comprising an outer pipe and an inner pipe, said outer pipe having heat transfer contact points said outer pipe being in contact with said inner pipe over at least a portion of its length and further in contact in at least in sub-zones thereof by means of circumferential contact deformations so as to facilitate heat transfer, said inner pipe comprising at least one section, said inner pipe delimiting with the opposing ends of its sections a circumferential gap that is filled with an elastic, heat-resistant and moisture-resistant cement.

4,955,433

HEATING OR COOLING ROLLER

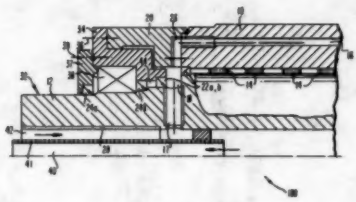
Heinz-Michael Zaoralek, Königsbronn, Fed. Rep. of Germany, assignor to Schwäbische Hüttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Nov. 14, 1989, Ser. No. 435,899

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1988, 3838726

Int. Cl.[5] F28F *5/02*

U.S. Cl. 165—89 7 Claims



1. A heating or cooling roller comprising a stationary axle, at least one hydrostatic or hydrodynamic bearing element to support a rotary roller shell on the stationary axle, and a heatable or coolable heat transfer medium which flows through an annular gap between the stationary axle and the rotary roller shell, wherein the roller shell has peripheral, axially parallel orifices for the heat transfer medium, and the heat transfer medium is supplied and removed through at least one radial channel in the stationary axle and via at least one annular space between the roller shell and the stationary axle.

4,955,434

RADIATOR ASSEMBLY AND A COWL ASSEMBLY THEREFOR

Henry C. Price, Carmarthen, United Kingdom, assignor to Llanelli Radiators Limited, United Kingdom

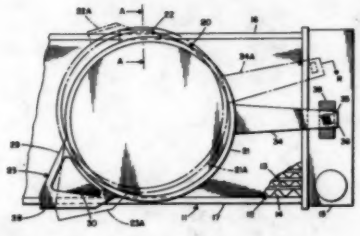
PCT No. PCT/GB88/00607, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO89/00931, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 25, 1988, Ser. No. 377,842

Claims priority, application United Kingdom, Jul. 24, 1987, 8717649

Int. Cl.[5] F01P *11/10*

U.S. Cl. 165—122 20 Claims



9. A cowl assembly for a radiator comprising a duct portion to direct cooling air towards or away from a fan and at least two securing means on one end of said duct portion to secure said cowl assembly to a radiator by co-operation with opposite ends thereof, the arrangement being such that in a first unlocked position the cowl assembly can be removed from the radiator and in a second locked position separation of the cowl assembly from the radiator is prevented, the transition from said first position to said second position being acheived by rotation of said cowl assembly relative to said radiator.

4,955,435

HEAT EXCHANGER FABRICATED FROM POLYMER COMPOSITIONS

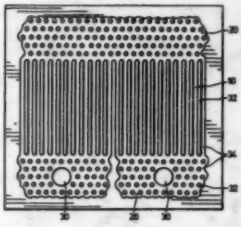
Jerry P. Shuster, Oakville, and Anthony J. Cesaroni, Agincourt, both of Canada, assignors to Du Pont Canada, Inc., Mississauga, Canada

Filed Apr. 6, 1988, Ser. No. 178,387

Claims priority, application United Kingdom, Apr. 8, 1987, 8708384; Apr. 8, 1987, 8708385

Int. Cl.[5] F28F *3/14*

U.S. Cl. 165—170 3 Claims



1. A panel heat exchanger comprising a generally planar panel having a pair of unitary outer walls of a thickness in the range of 0.12–0.50 mm and formed from a composition of aliphatic polyamide, said unitary outer walls being circumferentially bonded together and further said unitary outer walls being bonded together to define inlet and outlet header areas and a labyrinth of fluid passages extending between the inlet and outlet header areas, said fluid passages occupying a substantial proportion of the area of the panel.

4,955,436

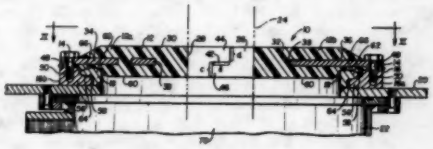
SEAL APPARATUS

Vaughn R. Johnston, 240 Kelley Rd., Washington, Pa. 15301

Filed Dec. 18, 1989, Ser. No. 451,608

Int. Cl.[5] E21B *33/02*

U.S. Cl. 166—82 10 Claims



1. A resiliently flexible seal assembly adapted to be mounted with respect to a seal mounting portion of a drilling rig to enclose the circumferential periphery of an elongated drilling apparatus comprising:

a pair of resiliently flexible members;

said resiliently flexible members having respective first sealing surface portions which are mutually engageable and second sealing surface portions which are mutually cooperable to enclose the circumferential periphery of such a drilling apparatus when said first sealing surface portions are mutually engaged;

a pair of rigid support members affixed with respect to said resiliently flexible members, respectively, to support said resiliently flexible members with said first sealing surface portions in mutually confronting relation and to selectively move said first sealing surface portions into said mutual engagement and said second sealing surface por-

tions into said enclosing relation about the circumferential periphery of such a drilling apparatus;

said first sealing surface portions being cooperable upon movement thereof into said mutual engagement to maintain mutually sealed interengagement therebetween with said second sealing surface portions in enclosing relation about the circumferential periphery of such a drilling apparatus and;

each said rigid support member including a surface means which is cooperable with such a seal mounting portion of a drilling rig to move portions of said resiliently flexible members into sealing engagement with such a seal mounting portion upon said moving of said first sealing surface portions into said mutual engagement.

4,955,437

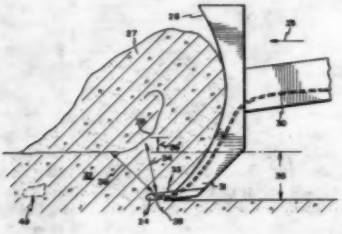
UNDERGROUND ELECTROMAGNETIC TILLAGE DEPTH SENSOR

Carl E. Bohman, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jan. 9, 1990, Ser. No. 463,257

Int. Cl.[5] E02F 9/20; A01B 63/111

U.S. Cl. 172—1 **23 Claims**



1. A device for determining the depth below the ground surface of a working member of an earth moving equipment, said device comprising:

(a) sensor means for transmitting an electromagnetic signal from underneath and toward the ground surface and for receiving a portion of the signal reflected from the ground surface;

(b) means for positioning said sensor means underneath the ground surface in fixed spatial relationship to the working member such that said sensor means is under the ground surface when at least a portion of the working member is under the ground surface; and

(c) means connected to said sensor means for processing the received reflected signal and for indicating the depth under the ground surface of the working member portion, whereby the time of travel of the signal and the reflected signal between said sensor means and the ground surface is proportional to the depth.

4,955,438

CORE DRILLING TOOL

Rainer Juergens, Celle, and Axel Sperber, Edemissen, both of Fed. Rep. of Germany, assignors to Eastman Christensen Company, Salt Lake City, Utah

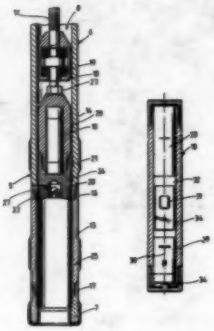
Filed Apr. 21, 1989, Ser. No. 341,928

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813508

Int. Cl.[5] E21B 25/02, 47/022, 47/06, 47/12

U.S. Cl. 175—40 **11 Claims**

1. Core drilling tool for drilling rock in underground soil formations with an outside pipe that can be connected by means of connecting devices at its upper end to the lower end of a drill column that can be rotated by means of a drive and can be connected at its lower end to a core drilling crown, and with an inside pipe that forms a separate component that can be conveyed to the surface and a supporting part which is supported in the outside pipe and is co-rotational with the latter as well as a core pipe part suspended on the carrying part by means of a bearing so it will not twist relative to the outside pipe and can receive a core cut by the drilling process, wherein the core pipe part comprises a measurement unit located in its



upper area for onsite acquisition, processing and storage of data that form parameters for the borehole, the drilling core and/or drilling process, and a traction device which can be connected to the inside pipe by means of a gripping device, said traction device comprising a line for transmission of measurement data to the surface.

4,955,439

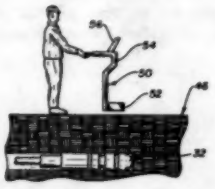
SELF-PROPELLED SUBSOIL PENETRATING TOOL SYSTEM

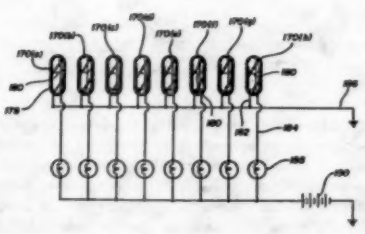
Frank R. Kinnan, Camas Valley, Oreg., assignor to Underground Technologies, Parsippany, N.J.

Division of Ser. No. 115,987, Nov. 2, 1987. This application Jun. 2, 1988, Ser. No. 201,198

Int. Cl.[5] E21B 47/022, 7/06

U.S. Cl. 175—45 **5 Claims**





1. A device for determining the orientation of a fluid oper-

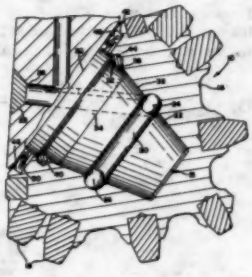
ated self-propelled subsoil penetrating tool with respect to a known reference comprising: mounting means fastened to said to and rotatable therewith, said mounting means having a plurality of radially extending grooves extending extending outwardly from a central aperture; a plurality of mercury switches, one for each groove and mounted in such groove for rotation with said mounting means; said mercury switches arranged to open and close in dependence upon the degree of rotation of said tool with respect to such known reference; a remotely-located display panel; a plurality of indicator lights, one for each mercury switch, mounted upon said remote panel in a circular array arranged to be lit or extinguished depending upon the state of the mercury switch closure; a plurality of coupling means, one for each mercury switch, each said coupling means coupled to a mercury switch and its associated indicator light; and a reference indicator on said panel whereby the adjustment of the reference indicator in response to the indicator lights lit shows the angular orientation of the tool with respect to said known reference.

4,955,440

ROTARY DRILL BITS WITH PLURAL SEALING SYSTEMS

Javier Chavez, Edo, Venezuela, assignor to Intevep, S.A., Caracas, Venezuela

Filed Jul. 19, 1989, Ser. No. 382,559
Int. Cl.[5] F16C *33/76*; F21B *10/22*
U.S. Cl. 175—371 **9 Claims**



1. An earth boring rotary bit comprising:

a bearing shaft defining a bearing surface having a substantially frusto-conical configuration and terminating at its proximal end in a pedestal having an outside diameter larger than the diameter of the bearing shaft;

a cutter cone secured for rotation about the bearing shaft and having a bearing surface complementary to that of the bearing shaft;

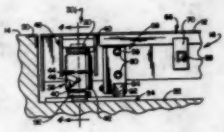
a plurality of axially spaced sealing assemblies between the bearing shaft and the cone, one of said sealing assemblies defining a primary seal about the bearing shaft for said complementary bearing surfaces and another of said sealing assemblies being mounted on said pedestal and defining a secondary seal that prevents fluid access to the bearing surfaces and provides a force vector substantially along the longitudinal axis of the bearing shaft, each of said sealing assemblies providing sealing action while coacting to stabilize rotation of the cone about the bearing shaft.

4,955,441

LOAD CELL MOUNTING FOR ROTATIONAL CONTROL

Nigel G. Mills, Worthington; Larry C. Heckendorn, Columbus; Curtis W. Long, Worthington, and Richard T. Smigel, Westerville, all of Ohio, assignors to Toledo Scale Corporation, Worthington, Ohio

Filed Sep. 26, 1989, Ser. No. 412,835
Int. Cl.[5] G01G *21/24, 19/02*
U.S. Cl. 177—255 **32 Claims**



1. Weighing apparatus comprising a base, a load cell receiving surface, at least one self-erecting rocker pin load cell positioned between said base and said load receiving surface for supporting said load receiving surface, said load cell having a longitudinal axis and being subject to both vertical and temporary transverse force vectors creating transient rotational force vectors urging said rocker pin to rotate about said longitudinal axis, and means for restricting rotation of said load cell about said longitudinal axis.

4,955,442

STEERING MECHANISM FOR A VEHICLE

Elmer R. Crabb, Aurora, and William J. Spivey, Joliet, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

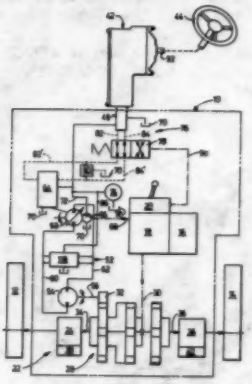
Filed May 16, 1989, Ser. No. 353,302
Int. Cl.[5] B62D *1/12, 11/18*
U.S. Cl. 180—6.44 **15 Claims**

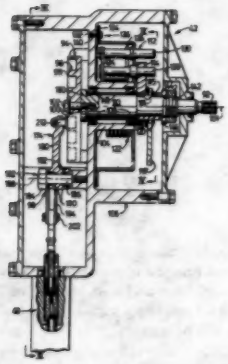
1. A steering mechanism of a vehicle for converting the rotational movement of a steering input control member to the controlled displacement of a left turn control valve and a right turn control valve, comprising:

an input shaft;

a single actuating cam connected to the input shaft for joint rotation about a central axis in either direction away from a central position in response to rotation of the steering input control member, the actuating cam defining a single profiled guide slot having a central transition portion and

a pair of end surfaces disposed oppositely away from the central transition portion; and





cam follower means for controllably displacing the left and right turn control valves and including a cam follower element received in the single profiled guide slot.

4,955,443

MOTOR VEHICLE WITH ALL-WHEEL STEERING

Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 1, 1989, Ser. No. 305,322

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1988, 3803466

Int. Cl.[5] B62D *7/14*

U.S. Cl. 180—79.1 **2 Claims**

1. A method of steering a vehicle, said vehicle including:

a steering wheel rotatable by a driver through a plurality of steering wheel angles,

a front steering system connected to said steering wheel, and

a rear steering system including

a first rear steering means for steering a pair of rear wheels of said vehicle only in unison in the same direction by an electric motor operated actuator of said first rear steering means, and

a second rear steering means for steering each rear wheel of said pair of rear wheels independently of the other rear wheel of said pair of rear wheels and independently of said first rear steering means,

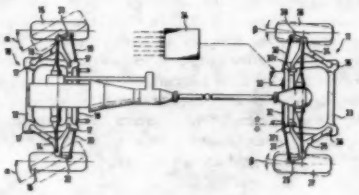
said method comprising the steps of:

sensing the velocity of said vehicle,

sensing said steering wheel angle,

steering said pair of rear wheels only by said first steering means in opposite phase relative to said front steering system when vehicle velocity is less than a predetermined velocity and steering wheel angle exceeds a predetermined steering wheel angle,

steering each rear wheel of said pair of rear wheels only by



said second steering means when vehicle velocity exceeds said predetermined velocity and said steering wheel angle is less than said predetermined steering wheel angle,

sensing the actuation of a braking system of said vehicle, and

oppositely steering each rear wheel of said pair of rear wheels by said second steering means so that each rear wheel of said pair of rear wheels toes-in when said braking system is actuated at vehicle velocities exceeding said predetermined velocity and at steering wheel angles less than said predetermined steering wheel angle.

4,955,444

HYDROSTATIC STEERING DEVICE

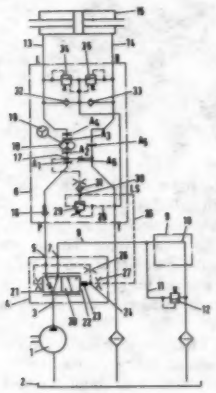
Jens K. Petersen, and Ole V. Sorensen, both of Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Apr. 10, 1989, Ser. No. 335,957

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814508

Int. Cl.[5] B62D *5/08*

U.S. Cl. 180—132 **7 Claims**



1. A hydrostatic steering device that is controlled by a steering element for controlling the flow of pressurized fluid from the pressurized outlet port of a pump to a fluid steering motor having first and second ports and the return of fluid to a container, comprising a priority valve having first and second outlets, and a slide member movable in a first direction and a

second direction, a tapping opening to the slide member for conducting fluid under pressure to urge the slide member to move in one of the first and second directions, a first fluid conduit fluidly connected to the first outlet of the priority valve, a control device for controlling fluid flow from the priority valve to the steering motor and from the steering motor to the container, the control device having a first junction, a first fluid connection, a second fluid connection fluidly connected to the steering motor first port, a third fluid connection fluidly connected to the steering motor second port, a first supply throttle, a flow meter, and a second supply throttle fluidly connected between the first junction and the meter, and a first check valve that opens toward the meter, is connected in series with the first supply throttle and is connected between the first junction and one of the first connection and the first conduit, first load means for providing a dynamic load pressure to operate the slide member between its positions, the first load means including a first pressure distributing throttle fluidly connected between the tapping and the first conduit, a second pressure distributing throttle fluidly connected to the tapping, and first conduit means fluidly connecting the second pressure distributing throttle to the first junction, the first conduit means including a second check valve that opens toward the first junction, second conduit means fluidly connected between the third connection and the container, the second conduit means including a return flow throttle and third conduit means fluidly connecting the return flow throttle to the container, and a withdrawal throttle fluidly connected to the first junction and to the second conduit means between the return throttle and the container, the withdrawal and return throttles forming a part of the control device, the withdrawal throttle having a neutral open position for conducting fluid from the first junction to the second conduit means.

4,955,445

HYDROSTATIC AUXILIARY POWER STEERING MECHANISM FOR MOTOR VEHICLES

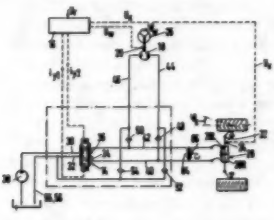
Wolfgang Kauss, Lohr-Wombach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Nov. 9, 1988, Ser. No. 268,777

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3738047

Int. Cl.[5] B62D 5/08

U.S. Cl. 180—133 **11 Claims**



1. A hydrostatic auxiliary power steering mechanism for motor vehicles comprising a steering cylinder having a power output controlled by a hydraulic servo mechanism, control loop means being provided for controlling and regulating a quantity of servo hydraulic fluid as a function of turning of a steering wheel of the vehicle, the fluid being supplied by a pump, wherein a hand pump is connected in parallel to the control loop means and is driven by the steering wheel.

4,955,446

HYDRAULIC POWER STEERING APPARATUS

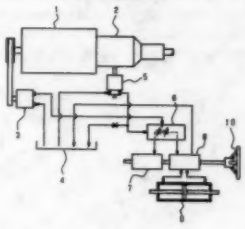
Hiroshi Ooishi, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Jan. 10, 1989, Ser. No. 295,640

Claims priority, application Japan, Jan. 26, 1988, 63-15228

Int. Cl.[5] B62D 5/08

U.S. Cl. 180—143 **8 Claims**



1. A power steering apparatus comprising:

a hydraulic cylinder for generating a force assisting a steering force,

a directional control valve having a casing and a valve body rotating relatively according to steering operation, and switching the feeding direction of pressured oil to said hydraulic cylinder responsive to the direction of relative rotation,

a constraining device operated by pressured oil and applying a constraining force between said casing and valve body to constrain said relative rotation responsive to the oil pressure,

a vehicle speed sensor pump rotated at a speed proportional to the vehicle speed and developing oil pressure corresponding to the rotational speed,

an oil pressure control valve for controlling the oil pressure fed to said directional control valve and constraining device responsive to oil pressure developed by said vehicle speed sensor pump,

said oil pressure control valve comprises a cylindrical casing provided with first and second communicating ports communicating separately with said constraining device, and

said oil pressure control valve controls said oil pressure fed to said constraining device by forming first and second variable throttles communicating separately with said first and second communicating ports.

4,955,447

COMPOUND TYPE GUIDING METHOD AND APPARATUS FOR GUIDING MOVEMENT OF A VEHICLE

Haruo Hashimoto, Kamakura, and Toyoichi Ono, Isehara, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

PCT No. PCT/JP86/00567, § 371 Date Nov. 30, 1987, § 102(e) Date Nov. 30, 1987, PCT Pub. No. WO88/03674, PCT Pub. Date May 19, 1988

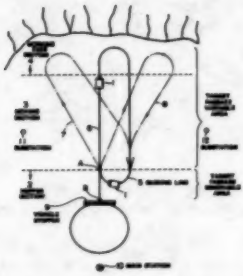
PCT Filed Nov. 7, 1986, Ser. No. 143,999

Int. Cl.[5] B60T 7/16

U.S. Cl. 180—168 **3 Claims**

1. A compound guiding apparatus for guiding the movement of a vehicle, characterized in that said apparatus comprises a guiding line for generating a magnetic field for the purpose of guiding movement of said vehicle, said guiding line being laid in a target passage immovable area where a high guiding accuracy is required, a main station for emitting radio wave for the purpose of measurement with the use of radio wave, two substations for emitting radio wave for the purpose of measurement with the use of radio wave, said main station and said two substations being located in a predetermined positional rela-

tion, a plurality of pickup coils for detecting a magnetic field for the purpose of guiding movement of the vehicle, said magnetic field being generated by means of a guiding line, said pickup coils being mounted on the vehicle, first steering command generating means for generating a steering command for the purpose of steering the vehicle in response to an output from the pickup coils, receiving means for receiving radio wave emitted from the main station and the two substations, said receiving means being mounted on the vehicle, vehicle position detecting means for detecting the existent position of the vehicle with reference to a difference in time when each receiving means receives radio wave, storing means for storing



moving passages along which the vehicle leaves the guiding line and returns to the same, second steering command generating means for generating a steering command for the purpose of steering the vehicle with reference to the existent position of the vehicle which is read out by said vehicle position detecting means and the moving passage which is read from said storing means, selecting means for selecting either one of a steering command issued from said first steering command generating means and a steering command issued from said second steering command generating means and steering means for steering the vehicle in accordance with a steering command which is selected by said selecting means.

4,955,448

CONTROLLER FOR REDUCING ACCELERATION SLIPPAGE OF A DRIVEN WHEEL

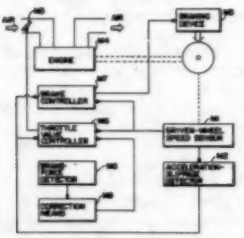
Kiyotaka Ise, and Kozo Fujita, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 22, 1989, Ser. No. 313,453

Claims priority, application Japan, Feb. 29, 1988, 63-46364

Int. Cl.[5] B60K *31/00*; **B60L** *3/10*; **B60T** *8/32*

U.S. Cl. 180—197 **7 Claims**



1. A controller for reducing acceleration slippage at a driven wheel of an automobile having an internal combustion engine, the controller comprising:

a driven-wheel speed sensor for sensing a speed of the driven wheel;

an acceleration-slippage detector for calculating slippage at the driven wheel based on the sensed driven-wheel speed when the automobile is accelerating;

a throttle-valve controller for adjusting an opening of a throttle valve of the engine according to a control amount to control the slippage;

a brake controller for adjusting a brake force on the driven wheel to control the slippage;

a brake-force detector for detecting the brake force on the driven-wheel; and

a correcting means for correcting the control amount such that the throttle valve is biased towards the closed position when the brake-force detector detects that the brake force on the driven wheel is increasing.

4,955,449

WHEEL SLIP CONTROL SYSTEM FOR MOTOR VEHICLES

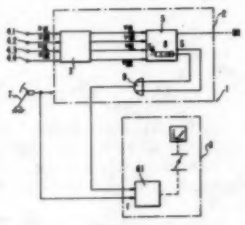
Walter Hilburger, Nürtingen, and Siegfried Ochs, Remshalden, both of Fed. Rep. of Germany, assignors to Diamler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 6, 1989, Ser. No. 403,314

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1988, 3831105

Int. Cl.[5] B60K *31/00*

U.S. Cl. 180—197 **6 Claims**



1. A wheel slip control system for motor vehicles having:

an engine, a driver operated gas pedal, driven and non-driven wheels and axles, and a control means for braking a driven vehicle wheel when it spins;

wherein when both driven wheels spin, the control means additionally reduces engine power; wherein

a spinning of the driven wheels is sensed by rotational speed sensors feeding an electronic control unit which creates a slip signal at a time when a differential speed threshold value between the driven and the non-driven vehicle axle is exceeded; wherein

engine power is a control element means of the electronic control unit during the time that the slip signal is created;

wherein when the slip signal drops out, the electronic control unit permits engine power to be controlled upward to a desired gas pedal value set by the driver; wherein

a time function element means is provided which can be activated by the electronic control unit; and wherein

the electronic control unit generates an output signal when slip signals occur at repeated intervals within a certain limit time to cause the time function element means to prolong the activating of the downward-controlling control element means beyond a duration of time of the last slip signal.

4,955,450

LIFTING DEVICE FOR MOTOR VEHICLES

Hans Deinlein-Kalb, Georg-Stefan-Str. 31, and Monika Festl, Georg-Stafan-Str. 35a, both of D-8500 Nürnberg 60, Fed. Rep. of Germany

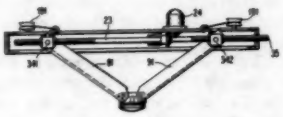
PCT No. PCT/EP87/00196, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO87/06548, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 10, 1987, Ser. No. 272,832

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613495

Int. Cl.[5] B60S *9/00*

U.S. Cl. 180—199 9 Claims



1. Lifting equipment for the turning on the spot of a four-wheeled motor vehicle with at least front-wheel drive, wherein the lifting equipment is provided with one of mechanical, pneumatic, hydraulic and electrical drive, is firmly mounted at an underside of the vehicle, and on actuation bears on the roadway such that two vehicle wheels are raised off from the roadway, characterised by: a supporting point (2) of the lifting equipment (4) being offset from the gravitational centre (3) and on the longitudinal center line of the vehicle such that, on actuation, the two rear wheels are raised off from the roadway and both front driving wheels are partially relieved with the lifting equipment bearing 60% to 80% of the vehicle weight and the partially relieved front wheels are loaded bearing the remaining vehicle weight, wherein the vehicle may then be turned about the support point by turning the front wheels and applying drive thereto.

4,955,451

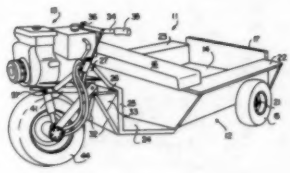
UTILITY VEHICLE

Stephen H. Schaefer, 1728 Missouri St., San Diego, Calif. 92109

Filed Oct. 17, 1988, Ser. No. 259,273

Int. Cl.[5] B62D *61/08;* B60K *17/00*

U.S. Cl. 180—213 5 Claims



1. A utility vehicle comprising:

a trailer head comprising:

a container bed-body;

a pair of wheels; and

first pivotable coupling means at the forward end thereof; and a power head comprising:

a frame;

second pivotable coupling means for detachably connecting said power head to said first pivotable coupling means;

wheel means;

power source means mounted to said frame;

steering means connected to said frame for steering said wheel means;

variable speed pump means coupled to said power source means;

reversible fluid motor means mounted to said wheel means and fluid coupled to said pump means;

control means coupled to said variable speed pump means for controlling the speed and direction of rotation of said reversible fluid motor means; and

suspension means coupling said wheel means to said frame, said suspension means comprising:

an arm pivotably coupled at one end to said frame, said arm having said motor means mounted to the opposite end thereof, said motor means being mounted to said wheel means; and

shock absorber means connected between said frame and said opposite end of said arm.

4,955,452

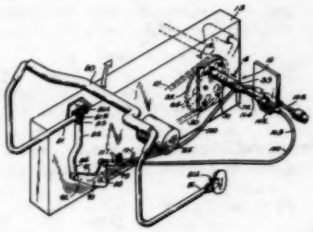
LOCKING APPARATUS FOR SKID STEER LOADER

John C. Simonz, Germantown, Wis., assignor to Trak International, Inc., Port Washington, Wis.

Filed Apr. 20, 1989, Ser. No. 341,116

Int. Cl.[5] B60R *21/02*

U.S. Cl. 180—271 14 Claims



1. A skid steer loader comprising:

a frame;

wheels for supporting the frame for movement;

a drive motor supported by the frame;

means for drivingly connecting the drive motor to at least one of the wheels for driving the wheel, the means for drivingly connecting including a rotatable member supported for rotation about an axis and having at least one aperture radially spaced from the axis of rotation of the rotatable member;

an operator restraint bar moveable between an operator restraining position and a retracted position;

means for locking at least one of the wheels when the operator restraint bar is moved to the retracted position, the means for locking including a locking member moveable between a retracted position and a locking position, and wherein in the locking position a portion of the locking member is housed in the aperture formed in the rotatable member;

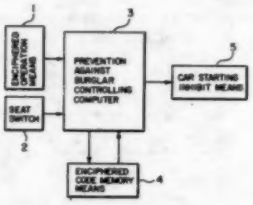
means connected to the operator restraint bar for moving the locking member to the locking position when the restraint bar is in the retracted position; and

means for biasing the locking member toward the retracted position when the operator restraint bar is positioned in the operator restraining position.

4,955,453
PREVENTION AGAINST CAR BURGLAR

Keiichi Nishioka, Kawasaki, and Atsushi Hirako, Yokohama, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 410,873
Claims priority, application Japan, Oct. 6, 1988, 63-252424; Aug. 11, 1989, 1-208558
Int. Cl.[5] B60R *25/00*
U.S. Cl. 180—287 **16 Claims**

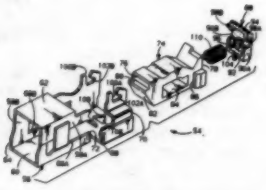


1. A prevention against car burglar comprising enciphered operation means capable of generating an electrical signal, a seat switch, enciphered code memory means, car starting inhibit means utilizing equipment other than an engine starting system, an engine rotation sensor, prevention against burglar controlling computer, which is characterized in that said car starting inhibit means is kept operating when a driver gets off as an engine idling, an operation of said car starting inhibit means it released when an enciphered operation signal generated by said enciphered operation means is identified with an enciphered code of said enciphered code memory means.

4,955,454
MODULAR BOLT ASSEMBLY FOR STEERING SHAFT LOCK

Karl A. Reinert, and Edmund L. Rendon, Jr., both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 13, 1989, Ser. No. 366,092
Int. Cl.[5] B60R *25/02*
U.S. Cl. 180—287 **4 Claims**



1. In a modular bolt assembly in an anti-theft steering shaft lock on an automotive steering column,

said modular bolt assembly including

a support tube adapted for rigid attachment to a stationary part of said steering column and having a generally rectangular cross section,

a bolt disposed in said support tube for radial bodily shiftable movement relative to a longitudinal axis of said steering column between an extended position engaging a keeper on a steering shaft of said steering column and restricting rotation thereof and a retracted position remote from said keeper,

a generally rectangular flat retainer in an open end of said support tube, and

a spring seated on said retainer and on said bolt and biasing said bolt in a first direction toward said extended position and said retainer in an opposite second direction,

the improvement comprising:

means on one of said retainer and said support tube defining a plurality of at least three trunnions disposed in a plane perpendicular to the direction of movement of said bolt and arrayed symmetrically around said spring, and

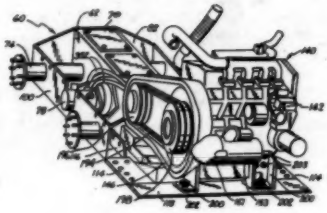
means on the other of said retainer and said support tube defining a corresponding plurality of at least three slots for receiving respective ones of said trunnions and each including a closed-ended portion extending parallel to the direction of movement of said bolt to a closed end,

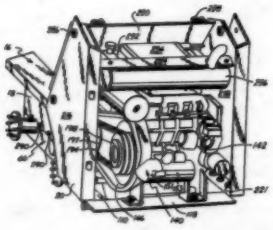
said spring moving said retainer in said second direction until each of said trunnions engages said closed end of the corresponding one of said closed-ended slots and biasing said trunnions against said closed ends to maintain said retainer on said support tube.

4,955,455
METHOD FOR ASSEMBLING A SKID STEER LOADER

Larry E. Albright, Gwinner; Joseph M. Mather; Orlan J. Loraas, both of Lisbon, and Carman Lynnes, Leonard, all of N. Dak., assignors to Clark Equipment Company, South Bend, Ind.

Continuation of Ser. No. 108,128, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 87,900, Aug. 21, 1987, Pat. No. 4,815,550. This application Jul. 27, 1989, Ser. No. 388,298
Int. Cl.[5] B60K *5/12*
U.S. Cl. 180—291 **18 Claims**





1. A method for assembling a skid steer loader, including:

fabricating a lower frame assembly including a front end, and a back end having an integral engine mounting structure;

providing an engine;

fabricating a main frame assembly having laterally spaced side members adapted to be mounted to the engine mount-

ing structure of the lower frame assembly and form side walls of an engine compartment;

mounting the engine to the engine mounting structure at the back end of the lower frame assembly; and

mounting the main frame assembly to the lower frame assembly after the engine has been mounted to the engine mounting structure at the back end of the lower frame assembly.

4,955,456

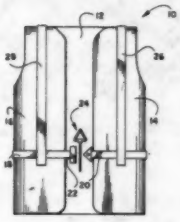
HUNTING VEST WITH ATTACHED ROPE

Dennis Mulkey, 272 S. Road Number 3 SW., Cartersville, Ga. 30120

Filed Jul. 18, 1989, Ser. No. 382,083

Int. Cl.[5] A62B *35/00*; A41D *1/04*

U.S. Cl. 182—3 **3 Claims**



1. A hunting garment for the upper torso of a human body, comprising:

a vest having a back panel, a left front panel and a right front panel;

a reinforced waistband having left and right end portions and being attached to said left, right and back panels of said vest with a loop formed by a portion of said reinforced waistband adjacent said back panel free of attachment to said back panel;

means for securely fastening said end portions of said reinforced waistband one to the other;

a left panel reinforcing band attached to said left front panel, said back panel and said reinforced waistband;

a right panel reinforcing band attached to said right front panel, said back panel and said reinforced waistband;

means for attaching a rope to said loop; and

a pouch attached to said back panel of said vest with said loop being positioned inside said pouch.

4,955,457

ARRANGEMENT FOR THE DEMOLITION OF SMOKESTACKS

Reinhold Pohl; Manfred Dresselmann, both of Ruhr, and Hans-Wilhelm Hessmann, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Robota GmbH Feuerungs- und Schornsteinbau, Mülheim a.d. Ruhr, Fed. Rep. of Germany

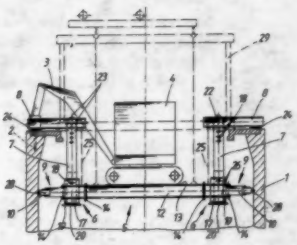
Filed Nov. 22, 1989, Ser. No. 440,900

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839677

Int. Cl.[5] E04G *3/10, 23/08*; E04H *12/34*

U.S. Cl. 182—128 **23 Claims**

1. In an arrangement for the demolition of a smokestack, the smokestack having a wall forming a shaft, a smokestack head and a smokestack base, the arrangement including a demolition tool for successively demolishing the smokestack shaft from the head to the base of the smokestack, the improvement comprising a work platform to be placed into the smokestack shaft at the head thereof, the work platform having a circumference, the work platform including a plurality of suspension devices which are distributed over the circumference of the work platform, each suspension device including at least one lowering piston, means for vertically guiding and locking the lowering piston, the lowering piston having an upper end, the suspension device further including a suspension arm, the suspension arm being mounted at the upper end of the lowering



piston so as to be swingable between an inwardly swung position and an outwardly swung position, the suspension arm engaging over the smokestack wall in the outwardly swung position.

4,955,458

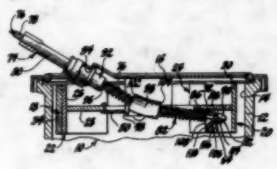
BLIND ASSEMBLY OF PARKING BRAKE CABLE TO PARKING BRAKE LEVER

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 117,120, Nov. 4, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 342,604

Int. Cl.[5] F16D *51/00*

U.S. Cl. 188—2 D **1 Claim**



1. In an enclosed drum brake having a parking brake actuating lever and a flexible parking brake cable having no bent preformed shape, one end of said cable being connected to said lever with said enclosed drum brake for exerting tension parking brake actuating forces thereon to move said lever pivotally to actuate the drum brake, means including guiding means providing a blind assembly connection of said cable one end to said lever within said enclosed drum brake where an assembler has no access thereto to make such a connection, said last named means comprising:

an enlarged button on one said end of said cable shaped to provide a sliding cam action when slidably engaging a camming surface along which said button is movable;

a cable return spring surrounding said cable near said button and acting as a cable guide and cantilever-like support during the process of assembly connection;

a guide and retention member on said lever;

and means for guiding at least said cable and said button in substantially axial movement from a point of entry of said cable and said button into said enclosed drum brake to said guide and retention member, flexibility of said cable permitting said cable and said button to follow the guiding direction of said guiding means and the guiding direction of said guide and retention member;

said guide and retention member having a retention member surface and a camming guide surface positioned for camming engagement with said button as said cable and said

button are first moved substantially axially from a first position spaced from said guide and retention member to a second position defined by the point of initial camming engagement of said button with said camming guide surface;

said camming guide surface being a non-linear ramp to provide non-linear contact with said button of said cable and said camming guide, and said camming guide surface receiving said spring in a non-attached manner allowing for translational movement of said spring, and said camming guide surface being shaped to guide and force said button and the adjacent portions of said cable and said spring translationally in a cantilever manner out of the axial movement path line of such first movement to side load said spring and said cable as said cable and button are further moved from said second position to a third position wherein said button is beyond said camming surface and out of engagement therewith, removing the camming surface action thereon;

said spring and cable thus having the side load removed therefrom and moving said cable, said spring and said button translationally back into said axial movement path line of said first movement and said button into tension retention engagement with said member retention surface, connecting said cable to said lever.

4,955,459

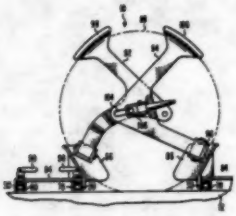
STRAPLESS WHEEL CHOCKING ASSEMBLY

Wayne H. Murphy, Pottstown, Pa., assignor to Consolidated Rail Corporation, Philadelphia, Pa.

Filed Feb. 28, 1989, Ser. No. 317,009

Int. Cl.[5] B60T 3/00; B60P 7/08

U.S. Cl. 188—32 **12 Claims**



1. Apparatus for securing a vehicle to a deck comprising:

a track secured to and extending along said deck;

a pair of chocking wedges mounted on said track for movement along said track to position the wedges on opposite sides of a vehicle wheel, said wedges being hingedly mounted on said track for swinging movement between a position on said deck where they can be positioned on opposite sides of the wheel and a position away from the deck to provide a clear deck for movement of the vehicle along the deck;

a separate arm hingedly mounted at one end on each of said wedges for swinging movement along the side of the wheel, each of said arms having a shoe on its other end adapted to extend across the periphery of the wheel; and

means for releasably securing the arms together with the shoes engaging the peripheral surface of the wheel to hold the wheel between the wedges and the shoes.

4,955,460

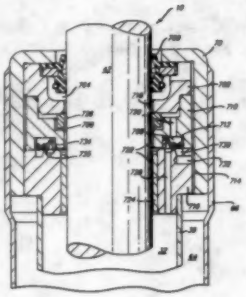
CONTROL VALVE FOR SHOCK ABSORBERS

Magnus B. Lizell, Stockholm, Sweden, and Albert E. Vanroye, Bogloon, Belgium, assignors to Monroe Auto Equipment Company, Monroe, Mich.

Continuation-in-part of Ser. No. 227,113, Aug. 1, 1988, abandoned. This application Mar. 13, 1989, Ser. No. 322,542

Int. Cl.[5] F16F 9/50, 9/36

U.S. Cl. 188—281 **8 Claims**



1. A shock absorber comprising:

a pressure tube symmetrically disposed about an axis, said pressure tube forming a working chamber having upper and lower portions;

a piston slidably disposed between and separating said upper and lower portions of said working chamber, said piston allowing restricted flow of hydraulic fluid between said upper and lower portions of said working chamber;

an elongated piston rod having first and second ends, said first end being attached to said piston, said second end of said elongated piston rod extending along the axis of said pressure tube through said upper portion of said working chamber and out one end of said pressure tube;

a fluid reservoir tube for storing hydraulic fluid, said reservoir tube disposed concentric to and radially extended from said pressure tube and having a closed end and an open end;

first valve means for allowing the flow of hydraulic fluid from said upper portion of said working chamber into said reservoir tube and for preventing flow of fluid from said reservoir tube into said upper portion of said working chamber through said first valve means, said first valve means disposed between said upper portion of said working chamber and said reservoir tube, said first valve means including seal retainer means adapted for positioning a seal with respect to said piston rod;

first passage means for enabling fluid to pass into said seal retainer means from said reservoir tube;

guide rod means for guiding said piston rod along the axis of said pressure tube;

second passage means for enabling fluid to pass into said guide rod means from said pressure tube out into said reservoir tube;

a valve for enabling fluid flow from said upper portion of said working chamber into said reservoir tube and for preventing flow of fluid from said reservoir tube into said upper portion of said working chamber, said valve being positioned in fluid communication with both said first and second passage means;

control means for controlling force on said valve for enabling opening and closing of said valve, said control means controlling force on said valve such that during a compression stroke of said piston, force on said valve is such that force of fluid within said upper portion of said working chamber opens said valve enabling fluid to pass from said upper portion of said working chamber into said

tube reservoir and said control means controlling force on said valve such that during rebound of said piston force on said valve is such that said valve is closed preventing fluid from exiting said upper portion of said working chamber into said reservoir; and

second valve means for allowing flow of said hydraulic fluid from said reservoir tube into said lower portion of said working chamber and for preventing flow of said fluid from said lower portion into said reservoir tube through said second valve means, said second valve means being disposed between said lower portion of said working chamber and said reservoir tube.

4,955,461

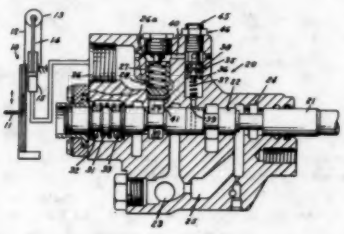
VALVE SYSTEM FOR PREVENTING UNCONTROLLED DESCENT IN FORK LIFT TRUCKS

John B. Keir, Rochester Hills, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Filed Oct. 31, 1988, Ser. No. 265,235

Int. Cl.[5] B66B *9/20*

U.S. Cl. 187—9 R **6 Claims**



1. A hydraulic lift valve system for fork lift trucks comprising

a fork movably mounted for vertical movement on a fork lift truck,

an actuator on said truck having a movable member,

a flexible connector connecting said fork and said movable member of said actuator,

a three-way valve including a bore, a spool in said bore having a first neutral position, a second lift position and a third lower position,

a poppet valve hydraulically connected to said cylinder for controlling flow to and from said actuator,

a pilot pressure valve hydraulically connected to said poppet valve,

said spool functioning in said second position to apply flow from a source to said actuator for lifting the fork of the truck only after the pressure exceeds a first predetermined value,

said spool functioning in said third position to permit exhaust of the fluid in the actuator cylinder and therefore lowering the fork only after a second predetermined pressure is established by said pilot pressure valve to cause said poppet valve to open, thereby insuring that the fork of the lift truck is not lowered unless there is a predetermined load on the fork thereby preventing uncontrolled descent of the fork when the fork inadvertently engages an obstacle which prevents descent.

4,955,462

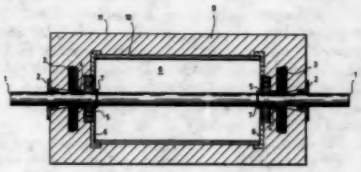
POLYMER CONCRETE CONVEYOR ROLLER

Marcel J. Bilodeau, St. Etienne; André Dube, Beauport, and André-Paul Quesnel, St. Jean Chrysostome, all of Canada, assignors to Produits Carmine Inc., Quebec, Canada

Filed Sep. 5, 1989, Ser. No. 403,116

Int. Cl.[5] B65G *13/00*

U.S. Cl. 193—37 **19 Claims**



1. In a conveyor roller comprising a shaft, a plurality of bearings provided on said shaft, and a roller body having an exterior cylindrical wall and two exterior end walls, said body being fixed to said bearings, and being rotatable on said shaft; the improvements wherein;

said roller body is made with a moldable polymer concrete material, and contains encapsulated labyrinth seal means which are connected to said shaft and are provided inside each end of said roller body between said bearings and each said exterior end wall; and

a spacer ring at each end of said roller body connects a housing of said labyrinth seal means to a housing of said bearings, said ring having a diameter which is smaller than both a diameter of the housing of said bearings and a diameter of the housing of said labyrinth seal means, so that said material of said body defines at each end of said roller body a wall between said bearings and said labyrinth seal means.

4,955,463

WORK SUPPLYING SYSTEM TO MACHINE TOOLS

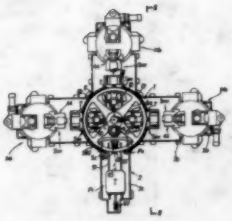
Eiichi Honma; Masakazu Hironaka; Masaki Miyazaka; Yutaka Ito; Kuniaki Ookuma, and Yoshiteru Kamiyama, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1989, Ser. No. 348,919

Claims priority, application Japan, May 12, 1988, 63-115703; May 12, 1988, 63-62566[U]

Int. Cl.[5] B65G *47/00*

U.S. Cl. 198—346.1 **13 Claims**



1. A work supplying system for supplying work pieces to machine tools, said work supplying system comprising a work piece conveyor for sequentially conveying a work piece attached to a pallet to a plurality of machine tools disposed around an imaginary center line at intervals in a circumferential direction, and a work piece conveying and delivery unit for conveying said work piece to said work piece conveyor and

delivery said work piece from said work piece conveyor, wherein a conveying and delivering station for conveying and delivering said work piece attached to said pallet, and a plurality of releasable stations are disposed around said imaginary circle which has a center on said imaginary center line, said releasable stations corresponding, respectively, to machining stations corresponding to machine tools for machining said work piece, and being located on linear lines connecting said imaginary center line to said respective machining stations, said work conveyor comprising a post stand with an axis thereof aligned with said imaginary center line, slide units each reciprocatively movable between an associated of said releasable and machining stations, a plurality of stationary guide rails extending in circular-arc shape along said imaginary circle at portions of said imaginary circle except portions at said conveying and delivering station and said releasable stations, movable guide rails disposed on said slide units and extending in a circular-arc shape at portions corresponding to said conveying and delivering station and said respective releasable stations and connectible to said stationary guide rails to form, cooperatively with said stationary guide rails, annular guide rails for guiding an angular displacement of said pallet around said post, an index arm supported on said post and angularly displaceably for releasable connection to a pallet on said annular guide rails, guide rods laid on stationary bases for guiding said slide units disposed between the associated releasing station and machining station, a pallet supporting plate having said movable guide rails and supported rotatably on said each of said slide units around an axis parallel to said guide rods, and a rotation driving motor for rotatably driving said pallet supporting plate.

4,955,464

CONVEYOR DEVICE FOR TRANSPORTING WORKPIECES

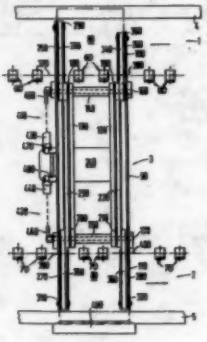
Karl-Heinz Burger, Bühl-Vimbuch; Rosemarie Collmer, Waiblingen; Walter Fimpel, Bühl-Oberweier; Klaus Gieseler, Villingen-Schwenningen-Obereschach; Heinrich Kochendörfer, Kernen-Rommelshausen, and Helmut Steegmüller, Affalterbach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 15, 1987, Ser. No. 146,368

Claims priority, application Fed. Rep. of Germany, May 3, 1986, 3615064

Int. Cl.[5] B65G *37/00*

U.S. Cl. 198—463.3 **8 Claims**



1. Conveyor device for transporting workpieces, comprising two parallel transport ways each including an outer conveyor belt and an inner roller system extending at a distance parallel to the outer conveyor belt; a transverse conveyor having a stationary support frame provided between the two transport ways and supporting an immovably arranged central conveyor section and two pivotably mounted end conveyor sections; each of said end conveyor sections intersecting the inner roller system of a transport way and bridging the space between the roller system and the corresponding outer conveyor belt; and device for pivoting respective end conveyor sections into predetermined vertical positions relative to the associated transport ways.

4,955,465

ENDLESS FLEXIBLE CONVEYOR BELT AND STACKER PLATES THEREFOR

Michael R. Straight, and Jack R. Raum, both of Winchester, Va., assignors to Ashworth Bros., Inc., Fall River, Mass.

Continuation-in-part of Ser. No. 224,696, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 171,390, Mar. 21, 1988, Pat. No. 4,867,301, which is a continuation-in-part of Ser. No. 83,272, Aug. 10, 1987, abandoned, and a continuation-in-part of Ser. No. 213,171, Jun. 29, 1988, which is a continuation-in-part of Ser. No. 171,390, Mar. 21, 1988, Pat. No. 4,867,301, and a continuation-in-part of Ser. No. 83,272, Aug. 10, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 406,348

Int. Cl.[5] B65G *21/18*

U.S. Cl. 198—778 **4 Claims**

1. An endless conveyor belt comprising:

a plurality of transverse rods having rod ends;

a plurality of links connected to said rods; and

stacker plates between said links, said plates including a longitudinal portion having upper and lower sections, a pair of tab portions extending in opposite transverse directions from upper ends of said upper section, said lower section including a member extending generally out from the plane of said upper section and defining a C-shape in a member plane perpendicular to said plane of said upper section, and said C-shape member having a pair of arms through which a pair of through holes pass and through which said rod ends pass.

4,955,466

BELT CONVEYOR WITH BELT REINFORCING MEMBER

Horst-Dieter Almes, Hildesheim, and Bernd Grutza, Sarstedt, both of Fed. Rep. of Germany, assignors to Transnorm System GmbH, Harsum, Fed. Rep. of Germany

Filed Jul. 6, 1989, Ser. No. 376,296

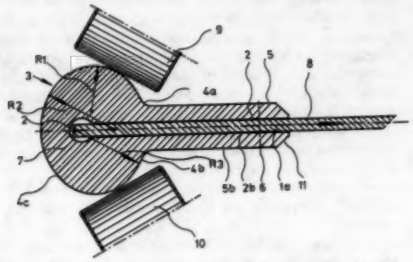
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822824

Int. Cl.[5] B65G *15/02*

U.S. Cl. 198—831 **20 Claims**

1. In a belt conveyor, an elongated belt comprising a convexly curbed outer marginal portion having two lateral surfaces and a peripheral surface between said lateral surfaces, each of said lateral surfaces having a first portion adjacent and a second portion remote from said peripheral surface; a reinforcing member having a slot receiving said marginal portion of said belt and said member including a bead surrounding said peripheral surface and overlying the first portions of said lateral surfaces, and two lips overlying the second portion of one of said lateral surfaces; and guide means for said reinforcing

member, comprising rolling elements engaging said bead and including a first rolling element adjacent one of said lips and a second rolling element adjacent the other of said lips, each of



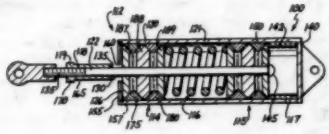
said first and second elements being rotatable about an axis making an acute angle with and sloping toward the respective lip in a direction away from said peripheral surface.

4,955,467

ENERGY DAMPING DEVICE

Ralph Kallenbach, Elgin, Ill., assignor to Fluor Corporation, Irvine, Calif.

Continuation of Ser. No. 119,084, Nov. 10, 1987, abandoned.
This application Dec. 21, 1988, Ser. No. 289,362
Int. Cl.[5] F16F *13/00, 7/00*; B60T *7/12*
U.S. Cl. 188—381 **16 Claims**



1. An energy damping device, comprising:

a piston cylinder assembly including a hollow cylinder and a piston mounted at least partially within said hollow cylinder;

a friction assembly acting forcibly between said cylinder and said piston for developing resistive frictional forces therebetween to dissipate large loads exerted axially on said cylinder and said piston relative to one another;

means for mounting said piston and said cylinder to be freely movable axially relative to one another independently of said friction assembly to permit small loads to move said cylinder and said piston relative to one another axially during normal operation;

wherein said means for mounting includes means defining an opening extending axially within said friction assembly for receiving freely and uninhibitedly said piston;

said piston including an enlarged portion extending radially therefrom at a position external of said friction assembly;

means for limiting the free axial relative movement of said cylinder and said piston relative to one another by engaging said enlarged portion of said piston;

means cooperating with said mounting means and said limiting means for defining a space;

said space permitting the limited substantially free relative travel of said piston prior to engaging said friction assembly without developing substantial resistive frictional forces under small loads during said normal operation; and

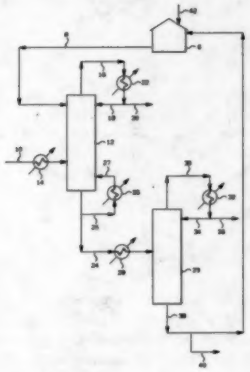
spring means acting against said friction assembly to urge it resistively for permitting said limited substantially free relative travel without causing substantial resistive frictional forces by said friction assembly responsive to said small loads only, and for biasing said friction assembly to cause said frictional forces to be developed responsive to said large loads only.

4,955,468

SEPARATION OF HYDROCARBON MIXTURES

Fu M. Lee, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 8, 1989, Ser. No. 404,799
Int. Cl.[5] B01D *3/40*
U.S. Cl. 203—53 **28 Claims**



1. In a process for separating at least one cycloalkane containing 5–10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of at least one N-mercaptoalkyl-2-pyrrolidone alone or in admixture with about 0.1–10 weight-% water, wherein the mercaptoalkyl group in said N-mercaptoalkyl-2-pyrrolidone contains 1–5 carbon atoms;

wherein said extractive distillation process produces (i) an overhead distillate product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottom product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

15. In a process for separating at least one aromatic hydrocarbon containing 6–18 carbon atoms per molecule from at least one alkane containing 5–20 carbon atoms per molecule by liquid-liquid extraction of a feed consisting essentially of said at least one aromatic hydrocarbon and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of at least one N-mercaptoalkyl-2-pyrrolidone alone or in admixture with about 0.1–10 weight-% water, wherein the mercaptoalkyl group in said N-mercaptoalkyl-2-pyrrolidone contains 1–5 carbon atoms per molecule;

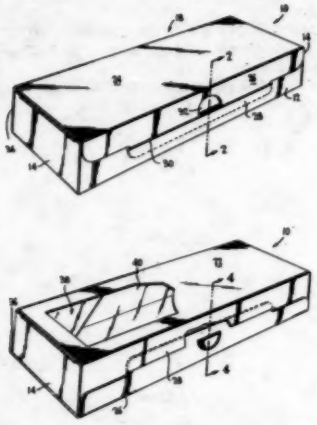
wherein an extract phase is formed which comprises said solvent and at least a portion of said at least one aromatic hydrocarbon, and a raffinate phase is formed in which the concentration of said at least one aromatic hydrocarbon is lower than in said feed.

4,955,469

CONVERTIBLE CONTAINER

Derick Hudspith, New York, N.Y., assignor to R. G. Barry Corporation, Pickerington, Ohio

Filed Sep. 6, 1989, Ser. No. 403,398
Int. Cl.[5] B65D *5/52*
U.S. Cl. 206—45.23 **3 Claims**



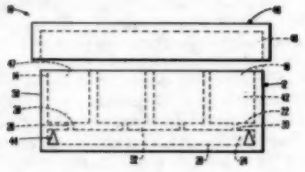
1. A packaging container comprising a front wall, a back wall, a top wall, a bottom wall and two end walls joined to each other to form an enclosure of a generally rectangular configuration, said top wall having an opening therein for display of articles contained within the enclosure, the container further including a closure panel secured to the back wall and capable of being extended over the opening in the top wall as well as being capable of being folded about the back wall to reveal the opening, the closure panel having one mean for securing the closure panel to the front wall when the closure panel is folded about the back wall and when the closure panel is extended over the opening, wherein the closure panel is hinged along a line about equidistant from the top wall and the bottom wall.

4,955,470

PERSONAL UTILITY CONTAINER

Douglas M. Hamel, and Linda J. Peralto, both of 34202 Del Obispo #49, Dana Point, Calif. 92629

Filed Aug. 10, 1989, Ser. No. 392,018
Int. Cl.[5] B65D *81/18*
U.S. Cl. 206—213 **3 Claims**



1. A flexible false bottom personal utility container, comprising:

a generally rectangular false bottom box fabricated from a strong, light material and having interior walls defining a rectangular cross section in two dimensions interior, and having a first bottom surface forming a true interior bottom;

a thin removable generally rigid rectangular planar false bottom divider comprising two parallel planar surfaces disposed a short distance apart and said planar surfaces having dimensions incrementally smaller than the interior length and width dimensions of the box a short distance above the true bottom of the box and having interior surfaces defining a selected plurality of small holes therethrough by means of which holes a small amount of air can flow to and from the volume between the false bottom divider and the true bottom and that portion of the interior of the box above the false bottom;

support means capable of supporting the planar false bottom divider a selected short distance above the true bottom surface;

a generally rectangular cover capable of removeably coupling to the exterior surface of the top of the box in a tight generally air tight coupling;

at least two identical generally rectangular shaped longitudinal dividers comprising identical planar generally planar surfaces of length incrementally less than the interior length of the box and of height approximately equal to the height of the interior of the box above the false bottom, each having interior surfaces defining slits parallel to the ends thereof, the slits of width substantially equal to the thickness of the dividers and the slits of length at least half and approximately half the height of the longitudinal dividers; and

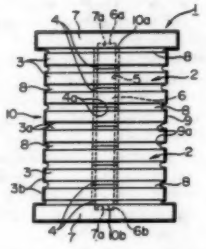
at least two identical generally rectangular shaped width dividers comprising parallel planar rectangular surfaces of length incrementally less than the interior width of the box, and of height substantially equal to the height of the interior of the box above the false bottom, each having interior surfaces defining slits parallel to the ends thereof, the slits being of width substantially equal to the thickness of the width dividers which is equal to the width of the longitudinal dividers and the slits of length at least half and approximately half the height of the width dividers.

4,955,471

PACKAGING STRUCTURE FOR A RING-SHAPED PRODUCT

Kimimoto Hirose, and Tsutomu Hiramoto, both of Tamaho, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 29, 1988, Ser. No. 238,031
Claims priority, application Japan, Sep. 5, 1987, 62-136105[U]; Nov. 17, 1987, 62-175158[U]
Int. Cl.[5] B65D *85/62, 85/671*
U.S. Cl. 206—303 **10 Claims**



1. An apparatus packaging a plurality of rolls of tape wound around angular stacked flangeless hubs, said apparatus comprising:

a core means passing through said stacked hubs of said plurality of rolls so that said hubs and rolls are aligned in a common axial direction,

a pair of end plate members sandwiching the stacked hubs therebetween, and

fixing means pressing said pair of end plate members axially toward said stacked hubs to fix the position of said hubs, said fixing means including a shrinkable film pressing the circumferential surface of said rolls of tape.

4,955,472

GOLF BAG WITH A CLUB SECURING DEVICE

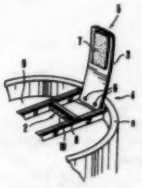
Wataru Yamazoe, No. 17-14, 4-chome, Todoroki, Setagaya-ku, Tokyo, Japan, assignor to Wataru Yamazoe, Tokyo; Takahiro Yamazoe, Toyohashi; Makiko Yamazoe and Yuriko Yamazoe, both of Tokyo, all of, Japan, a part interest to each

Filed Jul. 6, 1989, Ser. No. 376,308

Claims priority, application Japan, May 26, 1989, 1-61076[U]

Int. Cl.[5] A63B *55/00*

U.S. Cl. 206—315.6 **15 Claims**



1. Device for holding a golf club in a golf bag, comprising two partition frames mounted upon a golf bag in an opening thereof to define a space therebetween, and

means for partitioning said space defined between said two partition frames to define an inlet or compartment for receiving a golf club,

said partitioning means comprising a third partition frame partitioning said space and mounted upon said two partition frames to define said inlet or compartment,

and additionally comprising

a covering mounted upon at least one of the golf bag and said partition frames and shaped and positioned to extend from one end of said inlet or compartment to an opposite end thereof and over a head of the golf club to protect the head of the golf club when the club is inserted into said inlet or compartment, and

means for detachably mounting said covering upon an inner surface of the golf bag,

whereby the golf club, when inserted into said inlet or compartment, is protected from damage by any other clubs that might be inserted into the golf bag opening outside of said inlet or compartment.

4,955,473

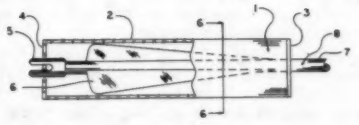
PROTECTIVE ENCLOSURE FOR FLETCHING ON ARROWS

James E. Van Hout, 676 Briarvale Dr., Auburn Hills, Mich. 48057, and John M. Van Hout, 1425 W. South Blvd., Troy, Mich. 48098

Filed Sep. 20, 1989, Ser. No. 409,817

Int. Cl.[5] F41B *5/06*; B65D *85/00*

U.S. Cl. 206—315.11 **18 Claims**



1. A protective device for an arrow fletching comprising an enclosure having a front member and a rear member, said enclosure being of a size to encompass the fletching of an arrow;

said front member having an opening extending therethrough and a series of slot like extensions projecting radially outwardly from said opening and through said front member;

each of said extensions being of a size to enable a radially extending element of a fletching of an arrow to pass therethrough;

said central opening forming a means for positioning an arrow shaft within said front member and for entrance of an arrow into said enclosure;

means within said enclosure for attaching an arrow to said enclosure with the arrow fletching within said enclosure and in alignment with said extensions of said opening.

4,955,474

WATER HEATER PACKAGE CONSTRUCTION

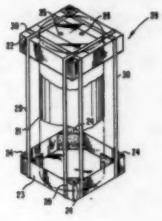
Bruce W. Mattingly, Louisville, and Roger J. Coates, Cox's Creek, both of Ky., assignors to Soltech, Inc., Shelbyville, Ky.

Continuation of Ser. No. 307,322, Feb. 6, 1989. This application Jun. 19, 1989, Ser. No. 367,764

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.[5] B65D *85/30*

U.S. Cl. 206—320 **5 Claims**



1. A composite package for appliances and the like comprising:

a top support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels being of a material which is stiffer than the material of the remainder of the corresponding members, said reinforcing panels arranged in an overlapping relationship to each other;

a bottom support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels being of a material which is stiffer than the material of the remainder of the corresponding members, said reinforcing panels arranged in an overlapping relationship to each other;

attachment means for attaching said top support to the appliance received within said composite package; and

securement means for securing together in a stacked relationship said top and bottom supports with said appliance therebetween.

4,955,475

CONTINUOUS FASTENER STOCK

Francis T. McCarthy, Lowell, and Roger J. Archambault, Blackstone, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Sep. 15, 1989, Ser. No. 407,628

Int. Cl.[5] B65D *85/24*

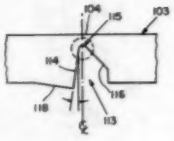
U.S. Cl. 206—346 **18 Claims**

1. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to

be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;

the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector defined by an indentation in said side member, said indentation comprising an outwardly diverging steep surface and a more obliquely sloped surface, which surfaces converge at an apex region of said indentation, the outer wall of the end-bar adjacent said steep surface having a trumpeted shape.

7. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;



the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector defined by an indentation in said side member, said indentation comprising an outwardly diverging steep surface which is oriented at a slight angle from a perpendicular to a longitudinal axis of said end bar, and a more obliquely sloped surface, said surfaces converging at a radiused apex region of said indentation.

13. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;

the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector defined by an indentation in said side member, said indentation comprising a surface which is oriented substantially perpendicular to a longitudinal axis of said end-bar, and a more obliquely sloped surface, said surfaces converging at a radiused apex region of said indentation.

4,955,476

FASTENER CARRIER FOR THE SUPPORT OF SCREW MEMBERS

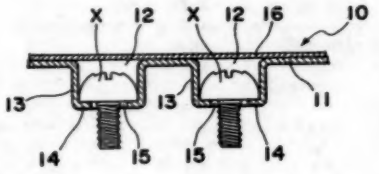
Akio Nakata; Masahiro Yoshida, and Koshiro Nakajima, all of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 136,636, Dec. 22, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 403,057

Claims priority, application Japan, Dec. 25, 1986, 61-311354; Dec. 29, 1986, 61-311011; Jan. 12, 1987, 62-4345; Jan. 12, 1987, 62-4346; Jan. 16, 1987, 62-8490

Int. Cl.[5] B65D *85/24*

U.S. Cl. 206—346 **11 Claims**



1. A fastener carrier comprising a carrier strip having a plurality of apertures extending therethrough, and screw members supported on said carrier strip,

each of said screw members having head and a threaded stem integral with the head,

a portion of each said threaded stem extending through a respective one of said apertures and having a cross-sectional area that is less than the cross-sectional area of said respective one of said apertures, a space being defined between said portion of the threaded stem and a peripheral portion of the carrier strip that directly surrounds the respective one of said apertures, and

each said head having an outer diameter that is larger than the diameter of the aperture through which the stem integral therewith extends, and each said head resting on said respective peripheral portion of said strip that directly surrounds the aperture through which the stem integral with said head extends,

said carrier strip being free of structure that is both non-removable therefrom and extends above each said respective peripheral portion and over the head of each of said screw members wherein the head of each of said screw members is unobstructed by said carrier strip so that each of said screw members is removable from said carrier strip by an automatic screwdriver having a vacuum sleeve under the vacuum created within such a vacuum sleeve.

4,955,477

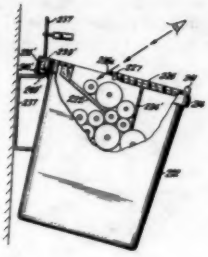
RECEPTACLE FOR STORAGE AND DISPOSAL OF POTENTIALLY INJURIOUS IMPLEMENTS SUCH AS USED SCALPEL BLADES, HYPODERMIC NEEDLES AND THE LIKE

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

Continuation of Ser. No. 384,879, Jul. 24, 1989, abandoned, which is a continuation of Ser. No. 311,429, Feb. 14, 1989, abandoned, which is a continuation of Ser. No. 898,973, Aug. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 833,335, Feb. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 826,288, Feb. 5, 1986, abandoned. This application Dec. 22, 1989, Ser. No. 455,983

Int. Cl.[5] B65D *25/00*

U.S. Cl. 206—366 8 Claims



1. A self-contained receptacle for safely storing potentially dangerous implements such as hypodermic needles, scalpel blades and the like, comprising:

a containment member proportioned to retain a plurality of implements; and

a top member adapted to be attached to said containment member,

said top member including an opening proportioned to receive a desired size of implements, a guide member extending generally angularly downwardly into said receptacle from said top member generally along one edge of said opening and a back-drop/stop member extending downwardly from said top member adjacent the side of said opening opposite the side adjacent to which said guide member is mounted, said back-drop/stop and guide members having distal edges which form a slot-like gap for allowing implements to drop into said receptacle, said back-drop/stop member including jagged edging facing said guide member, and said back-drop/stop member and said guide member being positioned and proportioned relative to each other to cause at least a momentary slowing of travel of implements along said guide member to ensure that each implement assumes a generally horizontal orientation before actually dropping into said containment member such that implements inserted through said opening are aligned in a generally horizontal orientation by cooperation between said guide and back-drop/stop members at said slot-like gap, thereafter to drop into said containment member for side-by-side stacking with other implements deposited therein and said jagged edging helping to deter hand entry into said receptacle.

4,955,478

FLIP-TOP DRILL-BIT STORAGE AND DISPLAY BOX

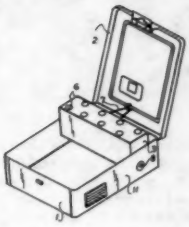
Georg Rau, Giengen-Hohenhemmingen; Werner Hitzler, Herbrechtingen, and Gerhard Riess, Bachhagel-Burghagel, all of Fed. Rep. of Germany, assignors to Firma Georg Knoblauch, Brenz, Fed. Rep. of Germany

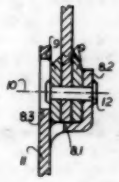
Filed Nov. 3, 1989, Ser. No. 431,609

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1988, 3837829

Int. Cl.[5] B65D *85/28*

U.S. Cl. 206—379 10 Claims





1. A storage/display box for elongated objects, the box comprising:

a body having a pair of generally parallel side walls spaced apart along an axis;

a cover pivoted on the body and engageable therewith to close same;

an insert engageable within the body and beneath the cover, the insert being connected to the cover for pivoting therewith and adapted to hold the objects;

a respective body tab projecting from each of the side walls generally at the axis and formed with

an inner part of part-cylindrical shape, centered on the axis and having an inner end connected to the respective side wall and an outer end, the inner part forming between its ends a part-cylindrical seat, and

an outer part projecting generally perpendicular to and crossing the axis;

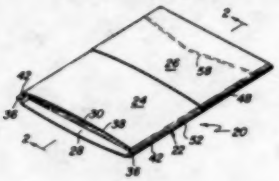
a respective insert tab formed on the insert adjacent each side wall at the axis, each insert tab having a part-cylindrical outer edge complementary to and fitting within the inner part of the respective body tab; and

a pivot axle passing through each body tab and the respective insert tab at the axis, whereby on pivoting of the insert on the body each outer edge rides on the seat of the respective inner part.

4,955,479
PACKAGE WITH PEELABLE PORTION FOR LIGHT SENSITIVE MATERIALS

Jeffrey S. Beer, Perkiomenville, and Michael D. Gracie, Sr., Kennett Square, both of Pa., assignors to Fres-co System USA, Inc., Telford, Pa.

Filed Aug. 24, 1989, Ser. No. 398,207
Int. Cl.[5] B65D *65/40*
U.S. Cl. 206—455 **30 Claims**



1. In an open package adapted for receiving light sensitive sheet materials therein and for being sealed to hold and protect said materials from ambient light, said package after being filled with said sheet materials and sealed being arranged for insertion into apparatus where said package may be readily opened to provide direct access to said materials so that said materials can be removed directly therefrom for processing, said package comprising a lower panel, a first upper panel, and a second upper panel, each of said panels being formed of a web of flexible, light-blocking material secured together to form an internal chamber for holding said materials therein, the improvement comprising first mouth means in said package through which said materials are introduced into said chamber and which is sealable to enclose said materials therein to prevent light from reaching said materials, and second mouth means which is sealed but readily openable by peeling to provide access to said materials in said chamber, said second mouth means directly communicating with the interior of said chamber and said sheet materials inserted therein, said lower panel having a leading edge, a trailing edge, and a pair of side edges, said first upper panel having a leading edge, a trailing edge, and a pair of side edges, said second upper panel having a leading edge, a trailing edge, and a pair of side edges, said first upper panel being secured to said lower panel by permanent seals extending adjacent their respective side edges, said leading edge of said lower panel and said leading edge of said first upper panel forming said first mouth means therebetween, with said leading edge of said lower panel and said leading edge of said first upper panel being sealable but not sealed to enable said materials to be readily inserted through said first mouth means directly into said chamber, said second upper panel being completely releasably secured to said lower panel by readily peelable seals extending adjacent their respective trailing and side edges, while also being completely releasably secured to said first upper panel by a readily peelable seal extending adjacent said leading edge of said second upper panel and said trailing edge of said first upper panel to form said second mouth means.

4,955,480
PORTABLE INSULATED CARRIER

Wilson C. Sexton, 18621 State Rte. 31, North Fort Myers, Fla. 33917

Filed Jul. 21, 1989, Ser. No. 383,933
Int. Cl.[5] B65D *81/18*
U.S. Cl. 206—528 **3 Claims**

1. A portable carrier for transporting pharmaceutical preparations while protecting those preparations from degradation by ambient temperature conditions, which carrier comprises

a first block of expanded polystyrene foam shaped as a rectangular parallelepiped, which block has a cylindrical bore extending vertically through the first block,

a base block of expanded polystyrene foam fixedly secured to the bottom of said first block, said base block being operative to permanently close a bottom end of said cylindrical bore,

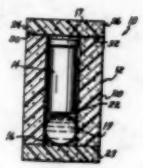
a closure lid of expanded polystyrene foam located on the top of said first block, said closure lid being hingedly connected along one side to one side of said first block so as, when closed, to cover a top end of said cylindrical bore,

contact adhesive applied to a top surface of said first block and a bottom surface of said lip for releasably sealing said lid in a closed position relative to said first block, and

a closed and sealed hollow plastic ball containing a refreezable liquid, said ball being located within said cylindrical bore, said ball being slightly smaller in diameter than the diameter of said cylindrical bore.

2. A portable carrier for transporting pharmaceutical preparations while protecting those preparations from degradation by ambient temperature conditions, which carrier comprises

a first block of expanded polystyrene foam, which block has a bore extending vertically through the first block,



a base block of expanded polystyrene foam fixedly secured to the bottom of said first block, said base block being operative to permanently close a bottom end of said cylindrical bore,

a closure lid of expanded polystyrene foam located on the top of said first block, said closure lid being operative, when closed, to cover a top end of said cylindrical bore,

contact adhesive applied to a top surface of said first block and a bottom surface of said lip for releasably sealing said lid in a closed position relative to said first block,

a closed and sealed hollow plastic container of refreezable liquid located within said bore,

a plastic vial located within said bore, said vial being adapted to receive a container of temperature-sensitive pharmaceutical preparation, and

said hollow plastic container being generally spherical in shape and slightly smaller in diameter than the diameter of said cylindrical bore.

4,955,481
TABLET PACKAGE HAVING ALTERNATIVE INDICATORS AND METHOD OF USE

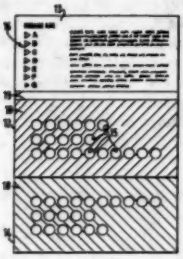
Michael V. Novinski, and Thomas J. Patton, both of West Chester, Pa., assignors to American Home Products Corp., New York, N.Y.

Filed Jul. 3, 1986, Ser. No. 882,128
Claims priority, application United Kingdom, Jul. 25, 1985, 8518828
Int. Cl.[5] B65D *83/04*; B42D *15/00*
U.S. Cl. 206—534 **15 Claims**

1. Packaging for a course of pharmaceutical tablets and comprising a folder having a base to incorporate a blister pack of tablets and a cover hinged to the base, a plurality of rub-off indicators being provided on the inner surface of said folder each indicator being associated with one of a range of alternatives of the course.

11. A method of indicating one of a range of alternatives in a course of pharmaceutical treatment, the method comprising

the steps of providing packaging for the course of treatment, said packaging having thereon a range of alternatives and a



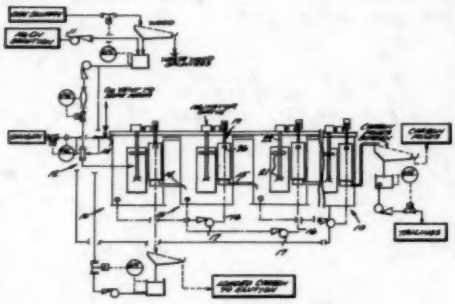
rub-off indicator for each alternative; and rubbing off one only of said indicators to indicate a desired alternative.

4,955,482

SCREEN CLEANING IN CIL & CIP SYSTEMS

Carl L. Elmore, and Phillip Mitchell, both of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Division of Ser. No. 778,265, Sep. 20, 1985, Pat. No. 4,900,430. This application Sep. 20, 1989, Ser. No. 410,052
Int. Cl.[5] B01D *33/00*
U.S. Cl. 209—17 10 Claims



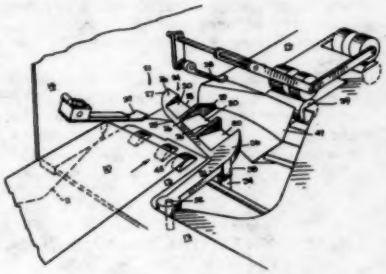
1. In the recovery a metal from a slurry of ore containing the metal, utilizing a tank having a slurry outlet, and a screen disposed in operative association with the slurry outlet for the prevention of solid material adsorbing particles therethrough, the process comprising the steps of: (a) leaching the metal from the ore, to dissolve the metal, utilizing a basic cyanide solution; (b) recovering the leached metal in solution by contracting the slurry with the solid material particles for adsorbing the metal from the solution; (c) screening the slurry flowing into the outlet to permit slurry to flow into the slurry outlet, the screen having screen openings dimensioned so as to prevent the passage of a significant number of particles therethrough; and (d) periodically linearly reciprocating the screen so as to provide a back flushing, self cleaning action thereto so as to keep it free and clear so that it will not clog and prevent the passage of slurry to the slurry outlet.

4,955,483

MAIL HANDLING MACHINE WITH MIS-SEALED ENVELOPE DETECTOR

Kevin J. O'Dea, Sandy Hook, and Francis E. McDermott, Watertown, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,099
Int. Cl.[5] B07C *5/00*
U.S. Cl. 209—548 19 Claims



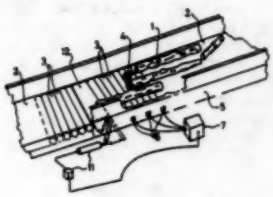
1. In a mail handling machine having means for serially transporting along a main path sealed and unsealed close-flapped and open-flapped envelopes some of which may be mis-sealed envelopes and means along the mainpath for moistening the flaps of the unsealed envelopes, the improvement comprising detection means upstream of the moistening means for detecting mis-sealed envelopes, said detecting means having means positioned to be engaged and moved by the mis-sealed flap of a sealed envelope, and signal means for generating a signal indicative of the detection of a mis-sealed envelope, said signal means responsive to the moved movable means.

4,955,484

DEVICE FOR SEPARATING HARD OBJECTS, SUCH AS STONES, FROM A STREAM OF WOOD

Kari Rintala, Helsinki; Jyrki Paarma, Soramaki, and Mikko Sissala, Hyvinkaa, all of Finland, assignors to Kone Oy, Finland

Filed Feb. 23, 1989, Ser. No. 314,541
Claims priority, application Finland, Feb. 29, 1988, 880930
Int. Cl.[5] B07C *5/34*
U.S. Cl. 209—599 13 Claims



1. A device for separating hard objects from a continuous stream of logs and/or blocks of wood in an apparatus for the continuous conveyance of logs and/or blocks of wood, which device comprises:

a. metal conveyor section comprised of metal rollers for conveying said wood stream and a metal support structure for said metal rollers;

b. at least one vibration sensitive transducer in conductive

contact with the metal conveyor section for registering vibrations;

c. means operatively connected to said at least one vibration sensitive trasnducer for distinguishing between signals generated by at least one said transducer in response to impact of logs and/or blocks of wood and signals generated on impact of hard objects on said conveyor section, including means for distinguishing between the frequencies of vibration caused respectively by logs and/or blocks of wood and by hard objects,

d. a control unit which incorporates said distinguishing means, for generating a control signal by which hard objects conveyed along with the wood stream can be detected on the basis of the vibration signals as they generate; and

e. actuator means which upon receipt of a control signal from said control unit, activates an exit gear, said exit gear being controlled by said control unit through said actuator means, so that said hard objects fall out from a wood stream passing through the apparatus.

4,955,485

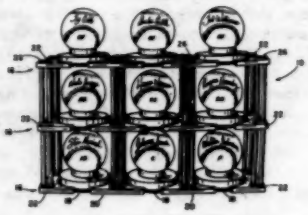
DISPLAY DEVICE

Forrest W. Alton, 24503 E. 111th, Broken Arrow, Okla. 74014

Filed Dec. 30, 1988, Ser. No. 291,963

Int. Cl.[5] A47F 7/00

U.S. Cl. 211—14 **5 Claims**



1. A display device comprising:

(a) a plurality of circular disc means for engaging adjacent center shelf means and end shelf means such that the assembly forms a display shelf;

(b) a plurality of center shelf means slidably engaging adjacent circular disc means such as to pivot about the center of said adjacent circular disc means;

(c) a plurality of end shelf means slidably engaging adjacent circular disc means such as to pivot about the center of said adjacent circular disc means; and

(d) a plurality of vertical structural means engaging the top of a first assembly of circular disc means, center shelf means and end shelf means forming a lower display shelf and engaging the bottom of a second assembly of circular disc means, center shelf means, and end shelf means forming an upper display shelf thus supporting the second upper display shelf, whereby the display shelves may be pivoted about said center shelf means so that the display device can be adjusted to form various arrangements.

4,955,486

GRAVITY FEED SHELF

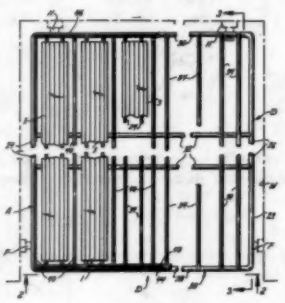
Robert J. Trulaske, Sr., Frontenac, Mo., assignor to True Manufacturing Co., Inc., O'Fallon, Mo.

Continuation-in-part of Ser. No. 215,571, Jul. 6, 1988, Pat. No. 4,890,746. This application Oct. 3, 1989, Ser. No. 416,393

Int. Cl.[5] A47F 7/00

U.S. Cl. 211—59.2 **5 Claims**

1. In a gravity feed container dispenser, the dispenser having a rack on which the containers are placed with the rack comprising a series of longitudinally extending rails which are parallel to each other and spaced apart a distance less than the diameter of the containers, the rack being adapted for installation so as to slope from rear to front when installed and having at least two guide bars extending longitudinally of the rack and positioned above the rails, the guide bars being spaced apart a distance at least slightly greater than the diameter of the containers so the containers are formed in rows when placed on the rack, and a stop means extending transversely of the rail across the forward end thereof and positioned above the rails so as to block forward movement of the containers when the forwardmost container in a row is removed and the other



containers in the row feed forward, the improvement comprising friction reducing means to facilitate forward feeding of the containers, the friction reducing means including a removable overlay placeable over the rails and having integrally formed attachment means for securing the overlay to the rack, the attachment means comprising a pair of longitudinal fingers extending from the underside of the overlay and snap-fitting onto two of the rails, the fingers being spaced apart to be closely adjacent the sides of each of said two rails and having turned ends overlapping said rails.

4,955,487

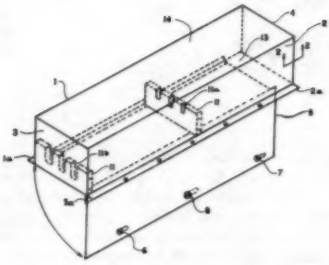
RAFTER GUN RACK

Robert J. Quallich, 3001 Hazelhurst Ave., Pittsburgh, Pa. 15227

Filed Jun. 5, 1989, Ser. No. 361,505

Int. Cl.[5] A47F 5/00

U.S. Cl. 211—64 **2 Claims**



1. A gun case in combination with a pair of rafters of an attic, for concealment, said gun case comprising a casing including a pair of side walls and a pair of notched partitions spaced longitudinally and extending laterally between said side walls in the case, a pair of outwardly turned ledges extending from the bottom of said side wallks of said gun case, said ledges being perforated to be screwed tightly against the exposed edges of said door including locking means for locking the door to the

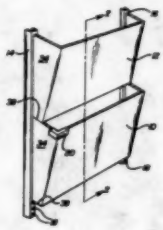
other of said ledges when pivotally moved at right angles to said sides to form the base of said casing.

4,955,488

CLUSTER BIN SYSTEM

James D. Nicoll, 829 Randall, Troy, Mich. 48098

Filed Apr. 24, 1989, Ser. No. 341,839
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—88 12 Claims



1. A cluster bin system including a unitary, planar member configured to be folded into a bin and attached to a wall, said planar member including a first, a second, and a third generally linear, hinge disposed so as to divide the planar member into fur regions;

said first region having a length defined by said second and third hinges and a base width defined by the separation of the second and third hinges proximate the first hinge, said first region configured to form the front surface of the bin when the planar member is folded along the hinges;

said second and third regions being separated from the first region by the second and third hinges respectively, said second and third regions being approximate mirror images of one another and having a base which is generally linearly aligned with the first hinge, said second and third regions configured to form the sides of the bin when the planar member is folded along the hinges, said second and third regions each having attachment means associated therewith for fastening the bin to the wall; and

said fourth region being separated from the first region by the first hinge and having a width which is no greater than the base width of the first region and a length which is greater than the length of the base of the second and third regions, said fourth region configured to form the bottom of the bin when the planar member is folded along the hinges and attached to the wall by said attachment means associated with the second and third regions, said bottom being planar and having a length greater than the distance from the first hinge to the wall, whereby said planar bottom is retained and supported by the wall without attachment thereto, and further wherein no means for connection is provided between the fourth region and the second or third regions.

4,955,489

STORAGE RACK SYSTEM

Donald R. Allen, Frenchtown, N.J., assignor to Frazier Industrial Company, Long Valley, N.J.

Filed Aug. 12, 1988, Ser. No. 233,122
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—151 14 Claims

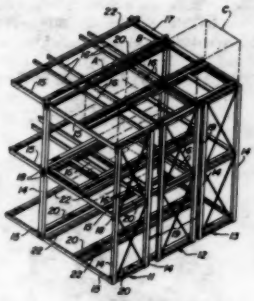
1. In a storage rack system for pallet loads having a framework providing a plurality of storage bays each of which is defined by a plurality of vertical uprights and horizontal shelf beams,

each of said storage bays comprising

a pair of track means extending from front to back along the depth of said storage bay and being spaced apart across the width of said storage bay,

a lower cart movable along said track means between a forward position and a back position and including

a frame providing support from a loaded pallet, said lower cart frame having a pair of sides made of a structural member having a straight undeformed vertical leg, a pair of wheel assemblies on each side of said lower cart frame, and means for supporting each of said lower cart wheel assemblies on said vertical leg of one of said sides of said lower cart frame so that the pair of lower cart wheel assemblies on one side of said lower cart frame are guided by and make good rolling contact with a first guide means of one of said track means as said lower cart moves along the depth of the storage bay between said forward and back positions thereof and so that said pair of lower cart wheel assemblies on the other side of said lower cart frame are guided by and make good rolling contact with a first guide means of the other of said track means as said lower cart moves along the depth of the storage bay between said forward and back positions thereof, each of said lower cart wheel assembly supporting means being fixedly secured directly to said vertical leg of said lower cart frame structural member so that the load transmitted to each of said lower cart wheel assemblies from said lower cart frame is directed in a vertical direction through said vertical leg, and



an upper cart movable along said track means between a forward position and back position and including

a frame providing support for a loaded pallet, said upper cart frame having a pair of sides made of a structural member having a straight undeformed vertical leg, a pair of wheel assemblies on each side of said upper cart frame, and means for supporting each of said upper cart wheel assemblies on said vertical leg of one of said sides of said upper cart frame so that the pair of upper cart wheel assemblies on one side of said upper cart frame are guided by and make good rolling contact with a second guide means of said one track means as said upper cart moves along the depth of the storage bay between said forward and back positions thereof, said vertical leg of said side of said upper cart frame having a straight undeformed vertical extension, each of said upper cart wheel assembly supporting means being fixedly secured directly to said vertical extension so that the load transmitted to each of said upper cart wheel assemblies from said upper cart frame is directed in a vertical direction through said vertical extension,

said forward positions of both said lower cart and said upper cart being located at the entry end of the storage bay, said back position of said lower cart being located two pallets deep from the entry end of the storage bay, and said back position of said upper cart being located three pallets deep from the entry end of the storage bay,

said pair of track means being mounted on said storage bay framework, so as to be inclined toward the entry end of

said storage bay so that said lower cart and said upper cart are supported so that they tend to roll along said track means toward the entry end of said storage bay,

each of said track means comprising a channel means defining a first channel providing said first guide means arranged so that said first guide means of each track means face inwardly toward one another, and channel means defining a second channel providing said second guide means so that the second guide means of each track means face outwardly away from one another,

said channel means of each track means comprising a channel member having an I-shaped cross-section including a vertically extending web portion, a horizontally extending lower flange portion and a horizontally extending upper flange portion,

said lower flange portion of each of said channel members including a first tapered portion forming part of said first channel and arranged to provide an upwardly facing rolling surface which is inclined at a small angle to the horizontal and a second tapered portion forming part of said second channel and arranged to provide an upwardly facing rolling surfaced which is inclined at a small angle to the horizontal.

4,955,490

SHELF SYSTEM, PARTICULARLY PALLET SHELF SYSTEM

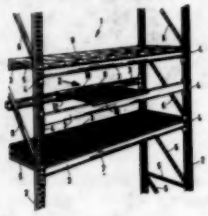
Gerhard Schäfer, Neunkirchen-Salchendorf, Fed. Rep. of Germany, assignor to Fritz Schafer Gesellschaft mit beschränkter Haftung, Neunkirchen, Fed. Rep. of Germany

Filed Dec. 29, 1987, Ser. No. 139,012

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1986, 3644692

Int. Cl.[5] A47B *47/00*

U.S. Cl. 211—187 **19 Claims**



1. A shelf system comprising upright posts and longitudinal girders and transverse girders fastened between the upright posts, wherein at least the longitudinal girders are support elements and are suspended from the upright posts, and wherein at least the longitudinal girders are sectional rails, further comprising laterally projecting sectional portions each defining a support bracket for auxiliary support elements of the shelf system, wherein the auxiliary support elements are selected from the group consisting of crossbeams, yokes, shelf boards, separating rods and separating walls, the laterally projecting sectional portions each being part of auxiliary or additional girders, the auxiliary or additional girders extending parallel to the longitudinal direction of the longitudinal girders and being releasably hooked to the longitudinal girders, the auxiliary or additional girders each having an upper hooking portion and a lower abutment portion, each longitudinal girder having a top and a bottom, the auxiliary and additional girders being connectible merely with the upper hooking portion to the longitudinal girder at the top thereof by means of a hooking connection and being connectible with the lower abutment portion to the bottom of the longitudinal girder by means of a hooking connection, the support brackets being part of the auxiliary or additional girders extending between the upper hooking portion and the lower abutment portion.

4,955,491

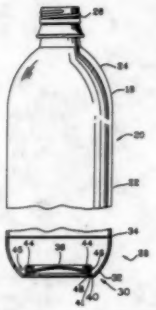
PLASTIC CONTAINER WITH REINFORCING RING IN THE BASE

Dennis L. Marshall, Wauwatosa, Wis.; Dale H. Behm, Ann Arbor, Mich.; Theodore F. Eberle, Saline, Mich., and Thomas F. Powers, Ypsilanti, Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed May 1, 1989, Ser. No. 345,294

Int. Cl.[5] B65D *25/24*

U.S. Cl. 215—12.1 **20 Claims**



1. A plastic container for carbonated liquid having a tubular side wall and a base structure merging with a lower end portion of the side wall, said base structure comprising:

a bottom wall extending downwardly from said side wall and closing said container, said bottom wall having a raised center portion forming an annular heel portion at the periphery of said center portion;

said center portion having an upwardly extending annular recess adjacent to and radially inwardly of said heel portion; and

an annular reinforcing ring seated in said recess, said recess being configured to engage and encapsulate a portion of said ring, said bottom wall being flexible so that when said container is filled with said carbonated liquid, the bottom wall forming said recess is forced against said ring to secure said ring to said bottom wall, said ring strengthening said bottom wall to resist eversion of said raised center portion.

4,955,492

PLASTIC BOTTLE WITH REINFORCING RING ENCIRCLING THE BOTTLE BASE

Dale H. Behm, Ann Arbor; Theodore F. Eberle, Saline, and Thomas F. Powers, Ypsilanti, all of Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed May 17, 1989, Ser. No. 353,003

Int. Cl.[5] B65D *1/02, 25/24*

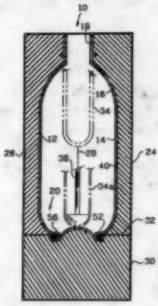
U.S. Cl. 215—12.1 **13 Claims**

1. A plastic container for carbonated beverages comprising:

a tubular body having an upright sidewall and a base structure extending downwardly from said sidewall so as to close the lower end of said tubular body, said base structure including an upwardly concave bottom wall at the center of said base structure, a shoulder extending generally upwardly from the periphery of said concave bottom wall and an outer wall extending upwardly and outwardly from said shoulder to connect said shoulder to said sidewall; and

an annular reinforcing ring extending about said shoulder and being of a size to engage said shoulder, carbonation pressure in said container exerting a downward force on said concave bottom wall forcing said shoulder radially outwardly against ring to secure said ring on said shoul-

der, said outward force creating tension in said ring and said ring being of a rigid material whereby said ring resists said outward force preventing eversion of said concave bottom wall.

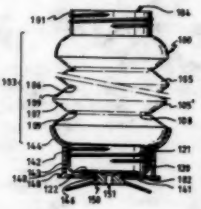


4,955,493

COLLAPSIBLE EXPANSIBLE PLASTIC HOLLOW ARTICLES IN A LATCHABLE CONFIGURATION

William N. Touzani, Wilhelmanistraat 11, 2595 Em Den Haag, Netherlands

Filed Aug. 15, 1989, Ser. No. 394,352
Int. Cl.[5] B65D *23/00*
U.S. Cl. 215—100 R **17 Claims**



1. A collapsible and expandable plastic hollow article comprising: a top **(101)** and a base **(102)** joined by a substantially cylindrical side wall **(103)** having an axis and being integral with said top and said base and an aperture **(104)** in the top **(101)**, said side wall comprising a plurality of substantially circular bellows **(105, 105')** formed by conical sections **(106, 107)** integrally joined to create at least a portion of said side wall **(103)**, the conical sections **(106, 107)** comprising alternating short portions **(107)** and long portions **(106)**, said short portions being at a greater angle to said axis than said long portions, said short portions joining with said long portions to form alternately junctures of greater and lesser diameters, the lesser diameter junctures **(108)** of the long portions **(106)** joining with the short portions **(107)** being formed to create fold rings **(109, 109')** for the substantially circular bellows; and connecting means for connecting a suction cup to said base, said connecting means being adapted for transferring an axially upwardly force exerted on said hollow article to said suction cup, so that in use the suction cup holds the base upon expansion of said hollow article.

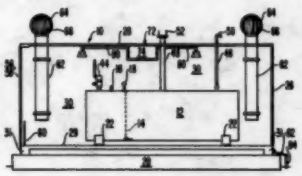
10. A device for use with a collapsible, expansible, plastic hollow article having a substantially cylindrical side comprising a plurality of substantially circular bellows, said hollow article having a base provided with a first connecting means, the device comprising a suction cup and being provided with a second connecting means being adapted for cooperation with said first connecting means for transferring an axially upwardly force exerted on said hollow article to said suction cup, so that in use the suction cup holds the base upon expansion of said hollow article.

4,955,494

FUEL CONTAINMENT MODULE

James D. Angelone, 5222 NW. 92 La., Coral Springs, Fla. 33067

Filed Jul. 6, 1989, Ser. No. 375,906
Int. Cl.[5] B65D *88/74*
U.S. Cl. 220—587 **18 Claims**



1. An above-ground storage device for volatile liquid, the device comprising:
- a tank for storing volatile liquid;
- base means for disposal beneath said tank;
- enclosure means including walls disposed on and above said base means for encasing said tank, said enclosure means defining air space between said tank and said walls and including a door opening and door means disposed in said door opening for providing access to said tank;
- air space ventilation means for ventilating said air space;
- tank vent means including at least one duct extending from said tank through one of said walls for ventilating said tank; and
- fire retaining means for retaining a tank fire within said enclosure.

14. An above-ground storage device for volatile liquids, the device comprising:
- a concrete base;
- a tank disposed above said base;
- a tank enclosure having walls surrounding and enclosing the tank and defining an air space between said walls and said tank, the enclosure including a door opening;
- at least one door mounted in said door opening;
- a liquid containment plate disposed across said door opening for retaining liquid within said enclosure in the event of a tank leak;
- at least one relief duct extending from said tank through a wall of said enclosure to vent said tank;
- at least one ventilation duct extending from said air space through said enclosure, said duct including a turbine for drawing air from said air space to outside said enclosure;
- at least one duct extending from said tank through a wall of said enclosure for conveying liquid between said tank and an area exterior to said enclosure; and
- at least one electrical connector electrically connecting said tank and said enclosure to an electrical ground.

4,955,495

HAZARDOUS WASTE CONTAINER WITH INTEGRAL HOLD-DOWN MECHANISM

George B. Ruebesam, Rte. 1, Box 29, Readsboro, Vt. 05350

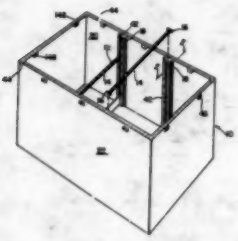
Filed Feb. 8, 1990, Ser. No. 476,884
Int. Cl.[5] B65D *21/00*
U.S. Cl. 220—545 **10 Claims**

1. A container for use with a hazardous waste compactor comprising:
- a generally rectangular bottom panel having two parallel side edges and two parallel end edges,
- two parallel side panels extending vertically upward from said side edges of said bottom panel, each said side panel having an inner face and an outer face,

two parallel end panels extending vertically upward from said end edges of said bottom panel, each said end panel having an inner face and an outer face,

at least one pair of opposed locking rails, one of said locking rails being attached to said inner face of each said side panel and extending vertically along said inner face, each said locking rail having a plurality of discrete positions,

at least one hold-down bar extending between said at least one pair of opposed locking rails,



said at least one hold-down bar having two ends, and resilient means on each of said two ends for cooperatively engaging one of said pair of opposed locking rails for permitting only downward vertical movement of said hold-down bar between said plurality of discrete positions along said locking rails as pressure is applied on said at least one hold-down bar.

4,955,496

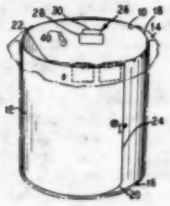
REFUSE BAG STABILIZER

Stanford C. Nelson, 8 S. Merrill Ave., Park Ridge, Ill. 60068

Filed Jul. 28, 1989, Ser. No. 386,347

Int. Cl.[5] A65D *25/14*

U.S. Cl. 220—1 T **18 Claims**



1. A liner for a bag, comprising:

(a) a panel member adapted to be rolled up to form a cylinder having a top end and a bottom end, the panel member including an overlapped portion within an interior of the cylinder and an overlapping portion on an exterior of the cylinder, the cylinder adapted to be inserted within the bag; and

(b) means for releasably securing the overlapped and overlapping portions together, said means for releasably securing comprising a clip attached to a top end edge of one of the overlapped or overlapping portions, said clip being formed to be substantially U-shaped in cross-section and to include two clasping members resiliently urged together, the clip further including a protruding member positioned substantially between the clasping members, the other of the overlapped or overlapping portions being received within and between the clasping members and including a catch that cooperates with the protruding member so as to receive the protruding member therein to prevent relative movement between the overlapped and overlapping portions, the clasping members clasping therebetween the other of the overlapped or overlapping portions.

4,955,497

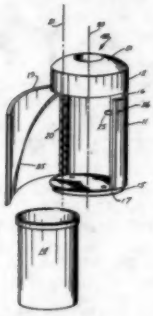
LITTER CONTAINER

Joseph D. Winden, 7382 Treeline Dr., SE., Grand Rapids, Mich. 49506, and John A. VerBerkmoes, Nunica, Mich., assignors to Joseph D. Winden, Grand Rapids, Mich.

Filed Feb. 14, 1989, Ser. No. 318,063

Int. Cl.[5] B65D *51/00*

U.S. Cl. 220—408 **20 Claims**



1. A litter container for use in an urban environment comprising:

a cylindrical body;

fastener means for mounting said cylindrical body on a support surface and resisting overturning moments of the type generated by a heavy cantilevered structure, said fastener means being disposed under said cylindrical body to prevent tampering;

an arcuate door disposed in said cylindrical body, said door comprising substantially a 180 degree arcuate section of said cylindrical body;

hinge means for pivotally mounting and cantilevering said door about a substantially vertical axis disposed on a first end of said door;

latch means for locking said door in a closed position upon closing of said door, said latch means being disposed on a second end of said door opposite said first end; and

a substantially helical-shaped stiffener disposed on the interior of said door; said helical stiffener extending from the top of said first end of said door to the bottom of said second end of said door.

4,955,498

SEALING STRUCTURE OF PRESSURE CONTAINER

Eiichi Hiraoka, Tokyo, and Junji Onaka, Iruma, both of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,679

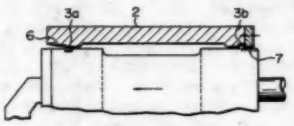
Claims priority, application Japan, Jul. 15, 1988, 63-92995[U]

Int. Cl.[5] F16J *15/16*

U.S. Cl. 220—3 **1 Claim**

1. A pressure container and sealing structure therefor comprising a cylindrical body having open portions at the front and rear ends and an inner body having a front end wall portion, a rear end wall portion, a connection portion for connecting said two wall portions and a space for receiving a sample, said inner body being forwardly pushed out of said cylindrical body in the axial direction when said sample is discharged from or received in said pressure container, said structure being char-

acterized in that, in order to make a seal between said two wall portions and said cylindrical body, a front packing is provided disposed in a groove on said front wall portion and a rear packing is provided disposed in a groove on a portion of said cylindrical body which opposes said rear end wall portion, said



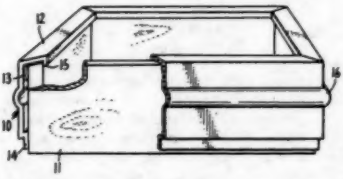
front and rear packings each having inner and outer diameters wherein the outer diameter of said front packing comprises a sealing surface thereof and the inner diameter of said rear packing comprises a sealing surface thereof, wherein the outer diameter of said front packing and the inner diameter of said rear packing are substantially equal.

4,955,499

RECEPTACLE UPDATE DEVICE

Petty, Byron, San Carlos, Calif., assignor to Fiberlite, San Carlos, Calif.

Filed Nov. 21, 1988, Ser. No. 274,424
Int. Cl.[5] B65D *6/24, 90/06;* **A01G** *9/02*
U.S. Cl. 220—4 E **8 Claims**



1. An updated architectural receptacle comprising in combination an architectural receptacle and a receptacle update device for restoring or changing the external appearance of said receptacle, said receptacle having a substantially vertical wall defining its original shape, an upper horizontal surface at the top of the vertical wall with an opening in said horizontal surface, the update device being affixed to the external surface of said receptacle and comprising two joined substantially rigid composite sheet sections, each of said sections corresponding substantially to half the perimeter of said receptacle said sections having an outer surface, an inner surface and a top lip, the sheet sections being sized so that the inner surface substantially conforms in dimension to the vertical wall of the receptacle with the top lip extending over the upper horizontal surface into said opening, said two sheet sections, as joined, substantially surrounding and enclosing the vertical wall and horizontal surface of said receptacle.

4,955,500

SEALING GROOVE COVER

John R. Rhoads, 23431 W. Peters Rd., Casa Grande, Ariz. 85222

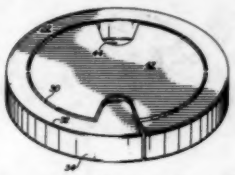
Filed Jul. 28, 1989, Ser. No. 386,121
Int. Cl.[5] B65D *43/06*
U.S. Cl. 220—212 **20 Claims**

1. A sealing groove cover for a cylindrical container having a center, an open top, a bottom, a vertically oriented cylindrical side wall with inner and outer surfaces, the container further including a continuous circular female groove disposed within the container side wall and having an outer perimeter coupled to the top of the side wall and an inner perimeter, the female groove serving to secure and seal a removable lid having a complementary circular male element to the top of the container, the sealing groove cover comprising:

a. a circular body fabricated from a bendable material and having a first end, a second end terminating in proximity to the first end and defining a gap between the first and second ends, the circular body further including an inner perimeter edge and an outer perimeter edge;

b. a circular outer sealing member fabricated from bendable material and coupled to the circular body along the outer perimeter edge, the outer sealing member being dimensioned to snugly contact the outer surface of the container side wall;

c. a circular inner sealing member fabricated from bendable material and coupled to the circular body along the inner perimeter edge, the inner sealing member being dimen-



sioned to snugly contact the inner perimeter of the female groove; and

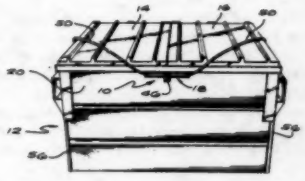
d. a circular male element fabricated from a bendable material and projecting outward from the circular body at a radial distance between the inner and outer sealing members in alignment with the female groove of the container for forming an interference fit between the sealing groove cover and the container female groove, the body, the inner and outer sealing members and the male element deflecting without breaking as the first and second ends of the circular body are displaced relative to each other by upward lifting forces and whereby the sealing groove cover prevents contaminating fluids or particulate matter from entering the female groove of the container when the lid is removed from the container.

4,955,501

TRASH BIN LID-LOCKING DEVICE

Allan M. Hodge, P.O. Box 202005, San Diego, Calif. 92120-0925

Filed Jan. 5, 1989, Ser. No. 293,939
Int. Cl.[5] B65D *45/00*
U.S. Cl. 220—315 **17 Claims**



1. A trash bin lid-locking device used to secure the lids of a trash bin, each of said lids having front corners, said device comprising:

two flexible cables, each of said cables having first and second ends;

means mounted on front of said trash bin and engaged to said first ends of said cables for selectively securing said lids shut and for selectively allowing said lids to be opened by providing slack in said cables allowing said cables to be (1) removably placed over said front corners of said lids

preventing opening of said lids, and (2) subsequently removed from on top of said front corners allowing said lids to be opened; and

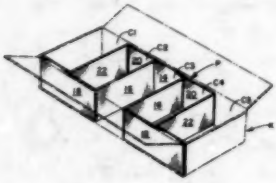
first bracket means attached to sides of said trash bin for selectively engaging said second ends of said cables.

4,955,502

FIVE CELL PARTITION

Anthony L. Sorci, Springfield, Mo., assignor to Container Corporation of America, Clayton, Mo.

Filed Sep. 25, 1989, Ser. No. 411,447
Int. Cl.[5] B65D *5/48*
U.S. Cl. 220—22 **4 Claims**



1. A collapsible partition structure formed from a unitary blank of foldable sheet material, such as paperboard, and adapted, when placed within an outer container having opposed first and second side walls and opposed first and second end walls, to provide five separate adjacent cells aligned in a row, said partition structure comprising:

(a) a first side outer panel adapted to lie against a container first side wall with opposed ends of said first side outer panel being spaced inboardly from respective container end walls;

(b) a first side inner panel having a length less than that of said first side outer panel and disposed against an inner surface of said first side outer panel intermediate said opposed ends of said first side outer panel;

(c) a pair of second side outer panels disposed to lie against a container second side wall;

(d) said second side outer panels being spaced from each other and having corresponding outboard ends disposed adjacent respective container end walls;

(e) a pair of second side inner panels, each having a length less than that of either of said second side outer panels, disposed against inner surfaces of respective second side outer panels;

(f) a pair of intermediate panels having corresponding first ends foldably joined to opposed ends of said first side inner panel and having corresponding second ends foldably joined to corresponding inboard ends of respective second side outer panels;

(g) a pair of end panels having corresponding first ends foldably joined to opposed ends of said first side outer panel and having corresponding second ends foldably joined to corresponding inboard ends of respective second side inner panels;

(h) means interconnecting adjacent upper edges of said first side panels to each other and means interconnecting upper edges of said second side panels to each other.

4,955,503

PARTITIONED DRINKING CUP

Michael L. Propes, 83 Sandra Ave., Greenville, S.C. 29611

Filed Feb. 2, 1989, Ser. No. 305,079
Int. Cl.[5] A47G *19/00*
U.S. Cl. 220—526 **7 Claims**

1. A partitioned personal drinking cup for simultaneously dispensing two different beverages to first and second persons without co-mingling comprising:

an open top container;

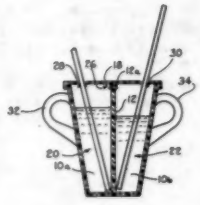
a partitioned wall dividing said container into a first drinking compartment for containing a first drink, and a second drinking compartment for containing a second drink;

a removable lid fitted over said open top of said container;

a first personal drink dispensing opening formed in a first part of said removable lid near a rim of said lid, and a second personal dispensing opening formed in a second part of said drinking lid near said rim of said lid;

said first and second dispensing openings being formed in said lid so that said first dispensing opening overlies said first drinking compartment in a centralized location and said second dispensing opening overlies said second drinking compartment in a centralized location when fitted over said open top of said container so that said first drink may be consumed directly by a first person and said second drink may be consumed directly by a second person; and

seal means for forming a seal between said lid and an upper edge of said partition to prevent liquids from mixing between said first and second drinking compartments which includes a first part carried by said lid and a second part



carried by said partition wall, and said first part and said second parts interfit together to provide an alignment means which prevents rotational motion between said lid and said cup so that said lid is secured over said open top of said cup in a correct position properly aligning said first and second dispensing openings over said first and second drinking compartments;

a first handle to be held by said first person while drinking from said first compartment of said cup, and a second handle held by said second person while drinking from said second drinking compartment of said cup; and

said first dispensing opening being associated with said first handle and said second dispensing opening being associated with said second handle whereby placement of said lid on said cup may be had in a proper position by referencing said first and second dispensing openings to said first and second handles facilitating proper placement of said seal means and said alignment means and centralized location of said dispensing openings relative to said drinking compartments.

4,955,504

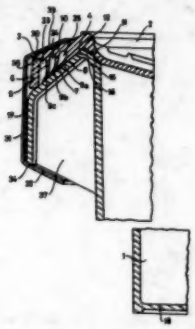
INJECTION-MOULDED PLASTIC LID FOR A CONTAINER AND A CONTAINER HAVING SUCH AN INJECTION-MOULDED PLASTIC LID

Bernardus A. Lesscher, Mariaparochie, Netherlands, assignor to Wavin B.V., Netherlands

Filed Oct. 5, 1989, Ser. No. 417,547
Claims priority, application Netherlands, Oct. 6, 1988, 8802456
Int. Cl.[5] B65D *43/08*
U.S. Cl. 220—352 **8 Claims**

1. Injection-molded plastic lid for a container having a first container upper rim part (15) which divergently adjoins the inner wall and which adjoins, via a sharp upper rim (28), an outwardly directed, downwardly sloping second container upper rim part (16) terminating in a downwardly directed apron (17) situated at a distance from the container wall, said

plastic lid (2) comprising a first lid inside rim part (11) being capable of engaging said first container upper rim part, which first lid inside rim part merges, via a lid top inside rim (12) into a downwardly sloping second lid inside rim part (4) being capable of engaging said second container upper rim part (16), and also a circumferential chamber (29) provided in said second lid inside rim part (4) and sealing means capable of engaging the second container upper rim part to form a seal, wherein said sealing means, being integral with the plastic lid, comprise at least two circumferential thin flaps, at least the bases of said flaps (6, 7, 8) being firmly attached to the wall of the chamber (29) to form a subchamber (23, 24, 25) situated next to each flap and the free lower ends of the flaps extending past an imaginary conical surface (26) forming a continuation of the second lid inside rim part (4).

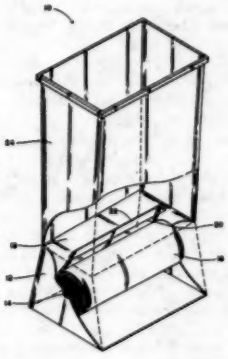


4,955,505

TRASH RECEPTACLE LINING SYSTEM

Michael A. Battaglia, 7609 W. Lake St., St. Louis Park, Minn. 55426

Filed Jun. 23, 1989, Ser. No. 370,179
Int. Cl.[5] B65D *25/16*
U.S. Cl. 220—407 **5 Claims**



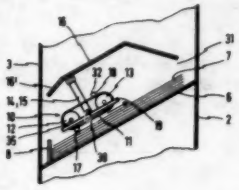
1. A trash receptacle lining system, comprising:
a receptacle having open top and bottom ends separated by an intermediate transverse partition;
a slot formed through said partition;
a spindle mounted transversely within said receptacle, between said partition and said bottom end;
a roll of perforated trash bags mounted for rotation on said spindle; and
brake means for selectively securing said roll against rotation.

4,955,506

DEVICE FOR THE INDIVIDUAL WITHDRAWAL OF SHEET-TYPE PRINTED PRODUCTS, IN PARTICULAR NEWSPAPERS

Franz Schweiberer, Klenzestrasse 105, D-8000 Munich 5, Fed. Rep. of Germany

Continuation of Ser. No. 168,854, Mar. 16, 1988, abandoned. This application May 1, 1989, Ser. No. 346,263
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709506
Int. Cl.[5] B65H *3/22*
U.S. Cl. 221—213 **4 Claims**



1. A device for the individual withdrawal of sheet-like printed products, such as newspapers, arranged in an inclined stack in a housing, comprising a carriage assembly movably positionable above said stack, said carriage assembly having a pair of aligned, spaced-apart gears pivotally mounted thereto; an endless conveyor connected about said gears, said conveyor having spaced-apart gripper rods affixed thereto; means for rotating said gears and thereby moving said conveyor and said gripper rods along said inclined stack; said gripper rods being affixed to said endless conveyor transverse to the direction of movement of said conveyor, each of said gripper rods having a plurality of gripper fingers; a guard plate supported above said carriage assembly in said housing and having substantially identical dimensions as the sheets to be withdrawn, and for covering said stack; and a withdrawal slot in said housing proximate the upper end of said inclined stack, formed between said guard plate and said housing, to receive products therethrough.

4,955,507

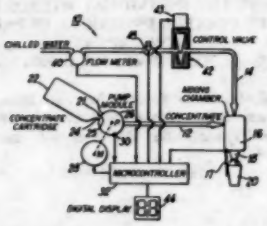
ORANGE JUICE DISPENSING SYSTEM

Jonathan Kirschner; Kenneth G. Smazik, both of Marietta, and Gary V. Paisley, Lilburn, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 924,379, Oct. 29, 1986, abandoned. This application Sep. 18, 1989, Ser. No. 408,813
Int. Cl.[5] B67D *5/56*
U.S. Cl. 222—65 **7 Claims**

1. Apparatus for reconstituting and dispensing juice comprising:
(a) a pump having a variable speed drive motor connected thereto and having an inlet port for receiving juice concentrate;
(b) a mixing chamber for mixing water and concentrate and for dispensing the mixture therefrom as a beverage;
(c) a concentrate conduit extending from said pump directly to said mixing chamber with no control valve or flow meter therein;
(d) a water line connected to said mixing chamber and a motorized, variable flow, control valve in said water line;
(e) first means for sensing the water flow rate and second means for sensing the speed of the pump and thus the concentrate flow rate; and
(f) a microcontroller for controlling the mixture ratio of the

beverage dispensed from said mixing chamber, said microcontroller being connected to said first and second sensing means for receiving signals therefrom, to said



motor for controlling the speed thereof and therefore the concentrate flow rate through said pump, and to said motorized, variable flow control valve in said water line for controlling the water flow therethrough.

4,955,508

CONTAINER AND METHOD FOR WASHING AND EFFECTIVELY COMPLEMENTING THE OPERATION OF DIALYSIS CIRCUITS AND FILTERS

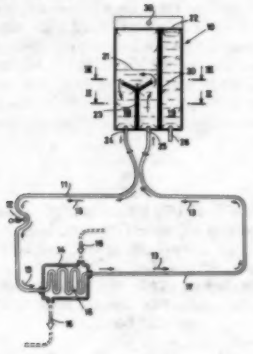
Dario Capanna, Milan; Alfredo Romeo, Segrate, and Luigi Mescia, Sondrio, all of Italy, assignors to Pierrel Hospital Spa, Sondalo, Italy

Filed Jun. 12, 1985, Ser. No. 743,823

Claims priority, application Italy, Jun. 25, 1984, 21580 A/84

Int. Cl.[5] B65D *35/22*

U.S. Cl. 222—94 **5 Claims**



1. A container for washing and operational completion of the extracorporeal blood circuit and filter of dialysis apparatus comprising a first fluid-tight chamber containing a first predetermined quantity of sterile physiological saline solution and a second fluid-tight chamber containing a second predetermined quantity, of sterile physiological saline solution, said first and second chambers being independent of one another and fluidically non-communicating; said first chamber being equipped with two fittings, fluidically connectable to said extracorporeal blood circuit, for inlet to and discharge from said first chamber; said second chamber being equipped with a single fitting, fluidically connectable to said extracorporeal blood circuit, for inlet to and discharge from said second chamber.

4,955,509

DISPENSING OF LIQUIDS

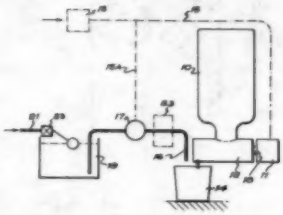
David C. E. Nevill, Northwood, England, assignor to Cadbury Schweppes plc, London, England

Filed Apr. 4, 1989, Ser. No. 333,493

Claims priority, application United Kingdom, Apr. 8, 1988, 8808193

Int. Cl.[5] B67D *5/56*

U.S. Cl. 222—129.4 **3 Claims**



1. A container for dispensing metered doses of liquid comprising:

(a) a container body for holding a bulk supply of liquid which has an outlet at the top thereof and which is for use in an inverted position;

(b) valve means integral with the container body;

(c) a dispensing outlet in said valve means;

(d) said valve means comprising a cylindrical outer sleeve which lies with its axis horizontal when the container is in use;

(e) a sleeve inlet in said sleeve in communication with said outlet from said container body;

(f) a cylindrical valve barrel rotatably positioned in said sleeve;

(g) a partition in said cylindrical valve barrel, which splits said barrel into first and second metering chambers;

(h) first and second inlet ports in said valve barrel located in a first vertical plane with said sleeve inlet, said first and second ports extending circumferentially of the valve barrel such that ends thereof lie closely adjacent the partition and such that the circumferential spacing between adjacent ends of said ports in less than the circumferential extent of the sleeve inlet;

(i) first and second chamber outlets in said valve barrel which are in a second vertical plane spaced axially of the sleeve from said first vertical plane;

(j) a sleeve outlet lying in said vertical plane;

(k) first and second venting outlets in said valve barrel in a third vertical plane axially spaced from the first and second vertical planes, for venting of air from said chambers;

(l) a venting outlet in said sleeve in said third vertical plane; and

(m) the container being adapted for use so that the valve barrel can be turned in the sleeve so as to have three operational positions, including a first position in which two adjacent ends of the valve barrel inlet ports communicate with the sleeve inlet and the interior of the container body for filling of the first and second chambers simultaneously, in which position the venting outlet in the sleeve and the sleeve outlet are blocked; a second position in which the inlet port of the first chamber communicates with the sleeve inlet and the interior of the container body for filling of the first chamber with liquid, the second venting outlet which is associated with the second chamber being in communication with the venting outlet of the sleeve, while the second chamber outlet is in communication with the sleeve outlet for the discharge of the contents of the second chamber from the valve means; and a third position which is similar to the second position

except that the second chamber fills while the first chamber drains, the container body and valve means therefore providing that at all times the bulk supply of liquid is in communication with and is always filling at least one of the first and second chambers.

4,955,510

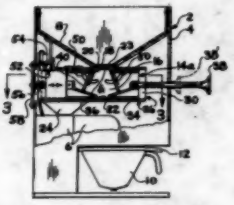
BEAN AND GROUND COFFEE CARRIER MEMBER FOR USE IN COFFEE SYSTEMS

Brian D. Newnan, Louisville, Ky., assignor to Grindmaster Corporation, Louisville, Ky.

Filed Apr. 20, 1989, Ser. No. 342,247

Int. Cl.[5] B65D *88/54*

U.S. Cl. 222—305 **30 Claims**



1. Coffee bean proportioning means for a coffee grinder assembly comprising

a housing,

a motorized grinder disposed in said housing and defining an inlet port for receiving whole beans to be ground,

a bean hopper mounted on said housing and defining an outlet port,

a bean carrier member defining a chamber for storing a predetermined volume of beans, said member having an inlet aperture and an outlet aperture and being disposed in said housing for linear movement between a first position wherein said chamber communicates with said hopper through said inlet aperture and is isolated from said grinder, and a second position wherein said chamber communicates with said grinder inlet port through said outlet aperture and is isolated from said hopper, said member further comprising

a box partially defining said chamber, said box having upper and lower surfaces defining said inlet and outlet apertures, respectively, and a pair of sidewalls, and

a floor formed in said box and sloping downwardly toward defining edge portions of said second aperture, said sloping floor having a negative angle relative to horizontal which is greater than the angle of repose of coffee beans to promote the flow of beans from said chamber through said second aperture to said grinder when said chamber is in communication with said grinder,

a pair of end walls pivotally attached to one of said sidewalls and disposed in said member over said floor to define end walls of said chamber on opposite sides of said inlet and outlet apertures, one of said sidewalls containing a pair of circular, arc-shaped slots therein, and

an adjustment pin connected to each of said end walls, each of said pins projecting through a corresponding one of said slots for being moved along said slots to tilt said end walls and thereby adjust the volume of said chamber, and means for moving said member between said first and second positions.

4,955,511

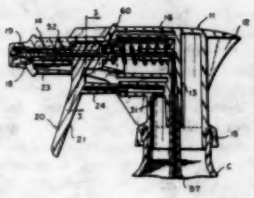
TRIGGER ACTUATED PUMP AND METHOD OF MAKING SAME

William S. Blake, 14 Georgetown Ct., Linwood, N.J. 08221

Continuation-in-part of Ser. No. 248,418, Sep. 23, 1988. This application Dec. 19, 1988, Ser. No. 286,072

Int. Cl.[5] B67D *5/00*

U.S. Cl. 222—321 **19 Claims**



1. A trigger actuated pump for attachment to a container for dispensing fluid, comprising:

a shroud with a housing defining a pump chamber;

a trigger actuated pump means for pumping the fluid to be dispensed and including a primary piston reciprocable in the pump chamber;

a nose piece integrally molded with said shroud and defining a cylinder and nozzle means having a bore therethrough for passage of said pumped fluid;

a secondary piston rigidly connected with said primary piston, and reciprocable in said cylinder; and

nose valve means in the cylinder for controlling flow of said fluid through said bore in the nozzle means responsive to the fluid pressures produced by the trigger actuated pump means, wherein said integrally molded shroud and nose section reduces the number of parts that need to be inventoried and simplifies assembly of the pump, thereby reducing the cost of the pump.

4,955,512

LIQUID CONTAINER AND DISPENSER FOR CONTROLLED LIQUID DISPENSATION

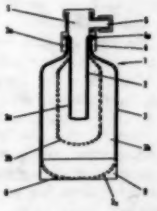
Leonard Sharples, Scarborough, England, assignor to Spliceriite Limited, West Yorkshire, England

Continuation of Ser. No. 147,257, Jan. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 78,178, Apr. 16, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 301,158

Claims priority, application United Kingdom, Jan. 22, 1987, 8701390; Jul. 24, 1987, 8717605

Int. Cl.[5] B67D *5/42*

U.S. Cl. 222—386.5 **10 Claims**



1. A liquid container which comprises:

(a) a housing;

(b) a charging and discharging opening provided on the housing for the liquid content of the container;

(c) a flexible and open-ended bag arranged in the housing to

communicate with said housing opening and defining an internal space within the container between the exterior of the bag and an internal wall of the housing; and,

(i) the bag being made of an elastomeric material and being of sufficient wall strength: to expand without rupture within the confines of the housing from a relaxed contracted state upon charging of the bag with liquid, and be returnable to its contracted state by its own inherent resilience in order to discharge its liquid content;

(d) valve means for controlling the charging and discharging of the liquid content of the bag via said opening; and,

(e) a pressure control valve communicating with the internal space defined between the exterior of the bag and the internal wall of the housing, said control valve allowing ingress of ambient air to the internal space as the bag contracts during liquid discharge, said control valve comprising an outer body having a restricted outlet for flow of air therethrough to atmosphere, a valve element positioned within said outer body immediately adjacent said restricted outlet, and spring means positioned in engagement with said valve element remote from said restricted opening and resiliently urging said valve element outwardly into sealing relation to said restricted opening whereby upon a predetermined negative pressure being created in the internal space defined between the exterior of the bag and the internal wall of the housing as the bag contracts during liquid discharge, said valve element will be moved to a non sealing position by atmospheric pressure thereon overriding said spring means.

4,955,513

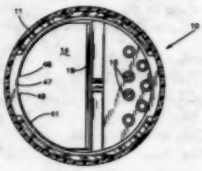
DISPENSING CLOSURE WITH FLAP RETENTION

Kurt K. Bennett, Cuyahoga Falls, Ohio, assignor to Weatherchem Corporation, Twinsburg, Ohio

Filed Jan. 16, 1990, Ser. No. 464,981

Int. Cl.[5] B67D *3/00*; A47G *19/24*

U.S. Cl. 222—480 **5 Claims**



1. A dispensing cap for containers comprising an injection-molded plastic one-piece body providing a circular end wall and a cylindrical skirt extending from one side of said end wall, said end wall providing at least one opening through which contents from an associated container can be removed without removing said cap from said associated container, said body providing a flap connected to said end wall by hinge means, said flap being pivotable from an open position in which said opening provides access to said associated container and a closed position closing said opening, said end wall providing an inwardly extending lip bordering said opening along portions thereof spaced from said hinge means and providing an inwardly facing inner first surface, said lip being interrupted along a recessed central portion to provide a central radially extending recess, said flap providing an outwardly facing second surface positioned in close face-to-face adjacency with said first surface when said flap is in said closed position and cooperating therewith to provide a seal preventing passage of contents of said associated container, and a radially extending latch adjacent said second surface which extends under said lip to releasably lock said flap in said closed position, said latch extending uninterrupted past said recessed central portion, whereby said latch is substantially unaffected by shrinkage of the plastic forming said cap and variations in tightness of said cap on a container.

4,955,514

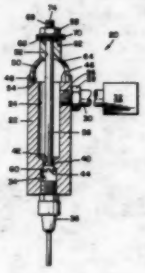
SEALLESS DISPENSING MECHANISM

Ewald F. Dickau, Glastenbury, Conn., assignor to Loctite Corporation, Newington, Conn.

Continuation of Ser. No. 274,666, Nov. 21, 1988, abandoned, which is a continuation of Ser. No. 57,614, Jul. 6, 1987, abandoned. This application Sep. 19, 1989, Ser. No. 409,278

Int. Cl.[5] B67D *3/00, 5/06*

U.S. Cl. 222—518 **19 Claims**



1. Apparatus for dispensing precise quantities of a broad range of fluid products, including adhesives and sealants, regardless of orientation, comprising:

(1) a wand-like dispenser portion, capable of dispensing the fluid product in a drop-wise or stream-like fashion, comprising a generally cylindrical housing defining a fluid reservoir and having a continuously open inlet for delivery of pressurized fluid product to the reservoir for continuously maintaining a filled reservoir and for maintaining pressure in said reservoir even when flow of fluid out of said reservoir may have been terminated and including a valve seat defining an outlet for dispensing the fluid product from the reservoir, said housing being open at an end opposite said valve seat and terminating thereat at a continuous annular end surface; and

a deformable resilient fluid tight closure member overlying the open end of said housing, said closure member having a central opening and an outer peripheral surface terminating in a continuous rim, said rim being sealingly engageable with said end surface; and

an elongated stem member extending through the outlet and including a gate member at one end, said gate member having a rounded surface for sealing engagement with said valve seat, said stem member being fittingly received in and extending through said central opening of said closure member and being fixedly and sealingly attached thereto distant from said gate member; and

said stem member and said closure member being responsive to an external force acting upon said stem member in the direction of the valve seat to thereby cause sufficient movement of said stem member in said direction, along the axis thereof, and deformation of said closure member to concurrently cause said gate member to move from a first position in sealing engagement with said valve seat to a second position disengaged from said valve seat thereby allowing the fluid product to be dispensed from said reservoir through said outlet; and

said stem member and said closure member being responsive to the removal of said external force such that the stem member returns to its original position and the closure member is restored to its original shape and, concurrently, said gate member moves from said second position to said

first position thereby terminating the dispensing of the fluid product; and

nozzle means attached to said housing such that said nozzle means and said valve seat define a dispensing chamber in which said valve gate reciprocates between said first and second positions and wherein when said valve gate moves from said second position to said first position said movement, and the concurrent movement of the stem member and the reformation of the closure member, cause the fluid being dispensed from the nozzle to rapidly reverse direction thereby causing the fluid to be drawn back into the nozzle so as to eliminate drippage;

(2) a pressurized source of the fluid product; and

(3) conduit means for supplying to said reservoir fluid product under pressure, said conduit means connected at one end to said pressurized source and at its other end to the inlet opening in said housing; wherein, in operation, said pressurized source and said conduit means operate to keep said reservoir filled with fluid product under pressure.

4,955,515

MAGNETIC THIMBLE

Kenneth J. Brull, 507 Dry Creek Cove, Round Rock, Tex. 78681

Filed Jun. 12, 1989, Ser. No. 369,520
Int. Cl.[5] D05B *91/04*
U.S. Cl. 223—101 **6 Claims**

1. A thimble comprising:

(A) a flexible outer body having an inner surface; and

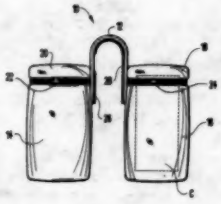
(B) a magnetic liner attached to said outer body on said inner surface, said liner covering essentially the entire area of said inner surface.

4,955,516

PORTABLE BEVERAGE CARRIER

Gary T. Satterfield, 659 E. 8th St., Upland, Calif. 91786

Filed Jul. 19, 1989, Ser. No. 381,806
Int. Cl.[5] B62J *9/00*
U.S. Cl. 224—35 **1 Claim**



1. In combination with a bicycle having a horizontal top frame tube, a portable beverage carrier adapted for removable mounting on said horizontal top frame tube, comprising:

a pair of insulated receptacles, each dimensioned to receive a standard beverage container;

a selectively openable cover for each of said receptacles;

a zipper for selectively closing each of said covers;

an elongated strap having opposite ends secured to each of said receptacles;

first cooperating hook and loop fastening members on a central portion of said strap and on said bicycle top frame tube for securing said strap to said bicycle top frame tube;

second cooperating hook and loop fastening members on facing portions of said opposite ends of said strap for securing said strap around said bicycle top frame tube;

a gel refrigerant material received in each of said receptacles;

and

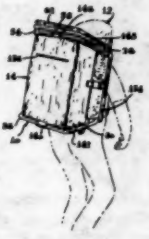
each of said receptacles and said covers formed from a fabric material lined with a gel refrigerant encapsulated within a water proof liner.

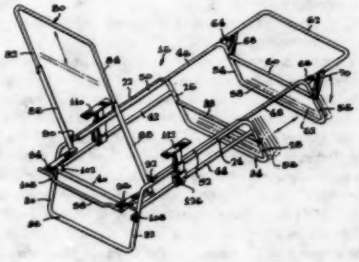
4,955,517

COMBINATION BACKPACK AND CHAISE

Carlo P. Maresca, 2220 Monte Vista Dr., Vista, Calif. 92084

Filed Jul. 17, 1989, Ser. No. 380,292
Int. Cl.[5] A45F *4/02*
U.S. Cl. 224—155 **20 Claims**





1. A combination pack and chaise comprising:

a main frame, side rails on said main frame, four legs on said main frame including left and right front legs and left and right rear legs;

a pack secured to said main frame and mounted below said side rails of said main frame and between said legs of said main frame;

a leg rest slidably mounted with respect to said frame, said leg rest having a left leg and a right leg, said leg rest being slidably mounted so that said leg rest legs can be moved from a position adjacent said front legs of said main frame to a position away from said front legs of said main frame;

a backrest, said backrest being pivoted on said main frame so as to move from a folded position where it lies parallel to said frame to a position where it is raised with respect to said frame to serve as a backrest main frame;

a chaise cover removably mounted on said backrest frame, mounted on said main frame and above said pack and said

leg rest so that the frame of said chaise can support a person while said pack serves as storage while said chaise supports a person and said cover can be removed from said frame, stored in said pack so that said combination pack and chaise can be carried on the back.

4,955,518

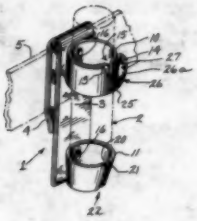
BATON CLIP FOR EXPANDABLE BATONS

Kevin L. Parsons, 16 Wagon Wheel Dr., Appleton, Wis. 54915; Gary M. Grundy, 921 E. Hamilton St., Milwaukee, Wis. 53201, and Jacqueline M. Dunstan, 604 Aspen St., South Milwaukee, Wis. 53172

Filed Mar. 31, 1989, Ser. No. 332,299

Int. Cl.[5] A45F *5/00*

U.S. Cl. 224—247 **4 Claims**



1. A baton clip for an expandable baton of the type including a handle and at least one telescoping member, the telescoping member being movable between a retracted position in which the telescoping member is contained substantially within a hollow interior of the handle and an extended position in which the telescoping member issues from an open end of the handle, the baton clip comprising:

a bas member;

retaining means attached to the base member, the retaining means including;

upper guide means formed of a resilient material having a first neutral shape which is adapted to slidably receive the handle of the expandable baton, and to provide a first resistance to lateral movement of the handle, the upper guide means including a first longitudinal break whereby the first resistance to lateral movement may be overcome by an application of a lateral force on the handle to temporarily deform the upper guide means and break the expandable baton out through the first longitudinal break, whereupon after the break out of the expandable baton, the upper guide means restores to said first neutral shape;

lower guide means formed of a resilient material having a second neutral shape which is adapted to receive the open end of the expandable baton handle, the lower guide means being mated to the open end of the handle such that when the open end of the handle is in contact with the lower guide means, the lower guide means provides both a second resistance to lateral movement of the handle and a third resistance to downward movement of the handle, the lower guide means including an aperture which allows the telescoping member to pass downward through the aperture when the telescoping member is in the extended position, and the lower guide means including a second longitudinal break whereby the second resistance to lateral movement is also overcome by the application of the lateral force on the handle to temporarily deform the lower guide means and break the expandable baton out through the second longitudinal break, whereupon after the break out of the expandable baton, the lower guide means restores to said second neutral shape;

wherein the baton clip is adapted to both hold, and allow the lateral break out, of the expandable baton with the expandable baton in both the retracted position and the extended position.

4,955,519

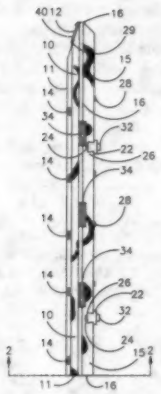
SKI CASE SLED

Keith E. Forrester, 38 Brookside Dr., Stratham, N.H. 03885

Filed Mar. 24, 1989, Ser. No. 328,242

Int. Cl.[5] B60R *9/04*

U.S. Cl. 224—319 **4 Claims**



1. In combination, a slim low-pressure drag container for transporting skis and ski poles or other materials in combination with at least one male dovetail guide of a roof-top of a vehicle, said container formed with at least one female channel to be connected to the at least one male dovetail guide; said at least one male dovetail guide and said at least one female channel being equal in number, said container comprising a top, a bottom, two side walls, and two end walls; said top including solid sled runners to allow the container to function as a sled; each said at least one male dovetail guide having (a) stop end bars cooperating with at least one of the at least one female channel to limit movement of the container when connected to the at least one male dovetail guide, (b) spacing bars, to securely retain the container on the at least one male dovetail guides, and (c) a locking bar, to lock the container to the at least one male dovetail guide; said end bars, said spacing bars and the locking bar, acting to secure the container onto a vehicle roof-top.

4,955,520

WEB FEED DEVICE HAVING AN IMPROVED LID MECHANISM

Gregory A. Ferguson, New Bedford, Mass., assignor to Precision Handling Devices, Inc., Fall River, Mass.

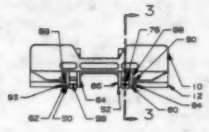
Filed Mar. 24, 1989, Ser. No. 328,424

Int. Cl.[5] B65H *20/20*

U.S. Cl. 226—74 **22 Claims**

1. A lid mechanism for a web feed device having a frame which has a wall, which lid mechanism comprises a lid member, a block extending from said lid member, said block having side faces angularly disposed to each other, a hinge pivotally connecting said lid and said wall for movement between open position where one of said side faces bears against said wall and closed position where another of said side faces bears against said wall, a spring mounted on said wall and bearing against said block to bias said faces of said block against said wall thereby applying compressive forces against said block, said hinge having parts extending from said wall and from said block including a portion of said hinge which is connected to

said block, means providing for the movement of said portion of said hinge towards and away from said wall to a position



where it is relieved of load, due to the bias from said spring on said block, when said lid is in said open position and when said lid is in said closed position.

4,955,521

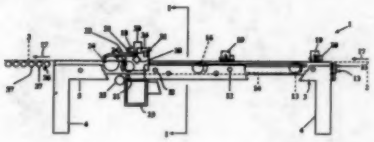
DOOR JAMB ASSEMBLY MACHINE WITH AUTOMATIC ALIGNMENT AND FEED

James V. Michael, Hayward, Calif., assignor to Senco Products, Inc., Cincinnati, Ohio

Filed Sep. 27, 1988, Ser. No. 249,726

Int. Cl.[5] B25C *7/09*

U.S. Cl. 227—3 **17 Claims**



1. An apparatus for constructing a door jamb assembly consisting of a jamb member, a pair of side members, and a stop member, comprising:

means for supporting the jamb member;

means for positioning the side members in the proper position relative to the jamb member;

means for aligning the stop member in the proper position relative to the jamb member;

fastening means containing a plurality of fasteners;

means for conveying the jamb member, side members, and stop members past said fastening means; and

means for actuating said fastening means to permanently fasten the jamb member, side members, and stop member into a door jamb assembly.

4,955,522

PROCESS FOR THE LEAKPROOF JOINING OF CERAMIC SEALING DISKS TO METALLIC ATTACHMENTS

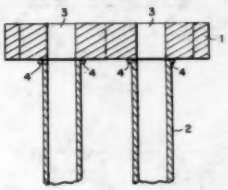
Helmut Stuhler, Röthenbach, Fed. Rep. of Germany, assignor to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,707

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810190

Int. Cl.[5] B23K *103/16*

U.S. Cl. 228—122 **17 Claims**



1. A process for the leakproof joining of a ceramic sealing disk having at least one opening with at least one metallic pipe having an opening, comprising the steps of:

(A) contacting together with solder the metallic pipe and a first face of the roughly finished sealing disk such that the opening of the metallic pipe corresponds to the opening in the sealing disk; then

(B) heating the pipe, disk and solder to the melting temperature of the solder; and

(C) thereafter producing by grinding, lapping or polishing a sliding and sealing second face on the sealing disk opposite the first face contacting the pipe.

4,955,523

INTERCONNECTION OF ELECTRONIC COMPONENTS

William D. Carlomagno, Redwood City; Dennis E. Cummings, Placerville, and Alexandru S. Gliga, San Jose, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 942,665, Dec. 17, 1986, abandoned, and a continuation-in-part of Ser. No. 942,667, Dec. 17, 1986, abandoned, and a continuation-in-part of Ser. No. 15,550, Feb. 13, 1987, abandoned. This application Feb. 1, 1988, Ser. No. 151,131

Int. Cl.[5] H01L *21/60, 21/603;* **B23K** *101/40*

U.S. Cl. 228—179 **14 Claims**

1. A method of interconnecting contacts on first and second electronic components, comprising:

(a) forming individual interconnection wires on each contact on the first component by:

(i) bonding a wire to the contact without the use of a material other than the materials of the contact and the wire, and

(ii) severing the wire to leave an interconnection wire bonded to the contact and having a free end, the length of the interconnection wire, measured from the contact or, if a portion of the interconnection wire is broadened in the vicinity of the contact, from a point immediately above any such broadening, being from about 2d to about 20d where d is the diameter of the wire;

(b) positioning the components so that the second component is in face-to-face relationship with the first component; and

(c) bonding the free end of each interconnection wire to a respective contact on the second component.

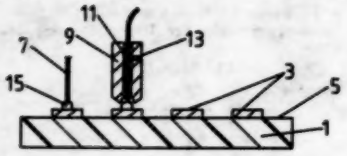
8. A method of forming an interconnection wire on a contact on an electronic component, comprising:

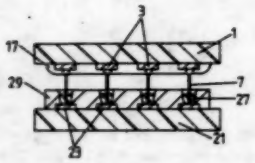
(a) bonding a wire to the contact without the use of a material other than the materials of the contact and the wire,

the wire being supplied through a bonding head on a wire bonder;

(b) weakening the wire at a point within the bonding head;

(c) severing the weakened wire to leave an interconnection wire bonded to the contact and having a free end, the





length of the interconnection wire, measured from the contact or, if a portion of the interconnection wire is broadened in the vicinity of the contact, from a point immediately above any such broadening, being from about 2d to about 20d where d is the diameter of the interconnection wire.

4,955,524

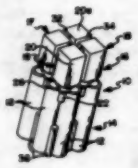
EXTRUSION DIE CONSTRUCTION AND ITS METHOD OF MANUFACTURE

Terrance Way, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1989, Ser. No. 399,184

Int. Cl.[5] B23K *31/02*

U.S. Cl. 228—182 **3 Claims**



1. A method of making an extrusion die for extruding honeycomb structure, the die having a plurality of feed holes, an extrusion slot pattern and a transition path for directing extrudable material from the feed holes through the extrusion slot to form the shape of a honeycombed body comprising the steps of:

stacking a plurality of individual tubes in spaced parallelism and bonding the outer surfaces of the tubes together to form a tube stack having a plurality of spaced parallel extrudable material inlet openings and a plurality of reference holes;

locating individual shaping teeth in each of said reference holes to define an extrusion slot pattern having intersecting rows corresponding to the shape of the honeycombed body formed as extrudable material is forced through the intersecting rows from the flow openings in the bonded individual tubes; and

bonding the individual shaping teeth to the tube stack to form a precision extrusion slot pattern with respect to the inlet openings.

4,955,525

HEAT EXCHANGER AND METHOD OF PRODUCING SAME

Hajime Kudo; Masami Asano, both of Susonoshi; Ken Toma, Mishimashi, and Yo Takeuchi, Susonoshi, all of Japan, assignors to Mitsubishi Aluminum Co., Ltd., Tokyo, Japan

Division of Ser. No. 34,835, Apr. 6, 1987, Pat. No. 4,842,185.

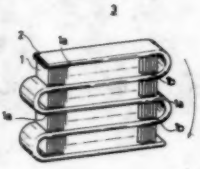
This application Feb. 27, 1989, Ser. No. 316,223

Claims priority, application Japan, Apr. 25, 1986, 61-94637

The portion of the term of this patent subsequent to Jul. 27, 2006, has been disclaimed.

Int. Cl.[5] F28F *19/02*

U.S. Cl. 228—183 **17 Claims**



1. A heat exchanger composed of an aluminum tube and aluminum fins abutted to said tube, the joints of said tube and said fins having been soldered by zinc deposited by a reaction soldering using a flux containing 10–50 weight % of zinc halide and 10–60 weight % of Zn powder in an inert gas atmosphere.

4,955,526

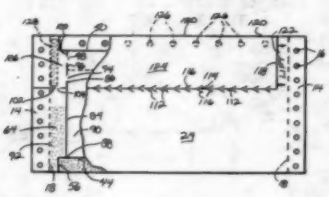
BUSINESS FORM SUCH AS AN ENVELOPE

Roger L. Haase, Arlington Hts., and Gary W. Fitzgibbons, Prairie View, both of Ill., assignors to Uarco Inc., Barrington, Ill.

Filed Mar. 1, 1989, Ser. No. 317,464

Int. Cl.[5] B65D *27/10, 27/34*

U.S. Cl. 229—69 **9 Claims**



1. A continuous business form envelope assembly comprising top and bottom elongated plies defining fronts and backs of a series of connected envelopes;

at least one intermediate elongated ply between said top and bottom plies defining insert material within each of the series of connected envelopes, said intermediate ply being die cut at intervals along its length to define openings through which adhesive may extend to join said top and bottom plies and define upper and lower individual envelope edges;

one longitudinal marginal edge of said intermediate ply being adhered to said top and bottom plies along corresponding longitudinal marginal edges thereof;

at least one line of perforation extending across the bottom ply to define a tear strip that may be removed to partly

expose said intermediate ply, one end of said tear strip being adhered to one side of part of said one longitudinal marginal edge of said intermediate ply, the other side of said part being adhered to the top ply via a less porous material on the latter;

said parts being separated from the remainder of said one longitudinal marginal edge by a line of weakening and connected to the remainder of said intermediate ply by one or more frangible connections which serve to register said remainder between said top and bottom plies;

said remainder of said intermediate ply otherwise being free of connection to said one longitudinal marginal edge;

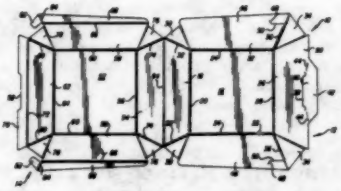
whereby removal of said tear strip from an envelope will remove said part by reason of it being adhered to said tear strip and only weakly adhered to said top ply because of said less porous material, and thereby will rupture said frangible connection and expose and free said insert material within the envelope for extraction therefrom.

4,955,527

CLAMSHELL STYLE CARTON

Stephen M. Blackman, Westmont, and Douglas L. Neale, Libertyville, both of Ill., assignors to Federal Paper Board Co., Inc., Montvale, N.J.

Filed Feb. 15, 1989, Ser. No. 310,666
Int. Cl.[5] B65D *5/20*
U.S. Cl. 229—114 **17 Claims**



1. A carton blank comprising first and second units including bottom and top units each including a base and front, rear and side panels connected to said base along fold lines, said units being hingedly joined together along a fold line joining together said rear panels, said first unit side panels being of a greater width than said first unit rear panel to form seats, and said second unit side panels carrying along fold lines disposed remote from said first unit base reversible seat members for seating on said seats, stop means being formed in each first unit side panel seat adjacent a front end portion of said seat.

4,955,528

CONTAINER FOR FOOD AND CONDIMENTS

Patricia A. Schluckebier, 88496 Partridge La., Springfield, Oreg. 97478

Filed Apr. 7, 1989, Ser. No. 334,893
Int. Cl.[5] B65D *5/48*
U.S. Cl. 229—120.18 **4 Claims**

1. A container formed from a one piece paperboard blank:

the blank having a first member, a second member, and a third member;

the first member having a central portion with a top edge, a bottom edge, and a first flap and a second flap;

the bottom edge of the central portion of the first member attached to the second member;

the first member of the blank having the first flap attached to a first side of the first member and the second flap attached to a second side of the first member;

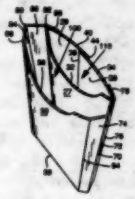
the third member having a central portion and a top edge, a bottom edge, and a first flap having a tap and a second flap having a tab;

the bottom edge of the central portion of the third member attached to the second member;

the first flap of the first member being folded behind the first member and glued to the bottom of the central portion of the first member;

the second flap of the first member being folded behind the first member and glued to the bottom of the central portion of the first member and to the first flap of the first member;

the second member being folded to bring the central portion of the third member coincidental to the central portion of the first member;



the first flap tab of the third member portion being folded behind the first flap of the first member and glued to the first flap of the first member;

the second flap tab of the third member being folded behind the second flap of the first member and glued to the second flap of the first member;

the central portion of the third member, the central portion of the first member and the second member forming a container receptacle for food; and

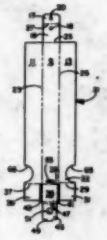
the central portion of the first member and the first and second flaps of the first member forming a container receptacle for containing condiments.

4,955,529

PRODUCE DISPENSER

William D. Barnhart, 629 Ransom St., Ripon, Wis. 54971

Division of Ser. No. 947,287, Dec. 29, 1986, Pat. No. 4,801,045.
This application Sep. 19, 1988, Ser. No. 247,430
Int. Cl.[5] B65D *5/38*
U.S. Cl. 229—122.1 **2 Claims**



1. A blank of material foldable into a receptacle, the blank comprising:

a. first and second elongated generally rectangular side walls having respective first and second ends and predetermined widths;

b. a generally rectangular back wall having first and second ends and a predetermined width, the back wall being interposed between and coextensive in length with the side walls, the back wall being separated from the first and second side walls by respective fold lines;

c. a first flap joined to the second end of the first side wall by a third fold line, the first flap having a length approximately equal to the width of the back wall;

d. a bottom panel joined to the second end of the back wall by a fourth fold line and having a length approximately equal to the width of the side walls;

e. a bottom end flap joined to the bottom panel along a fifth fold line parallel to the fourth fold line, wherein the bottom end flap defines a generally circular opening therethrough; and

f. a second flap joined to the second end of the second side wall by a sixth fold line, the second flap having a length approximately equal to the width of the back wall,

so that the first and second side walls can be folded along the first and second fold lines, respectively, to be perpendicular to the back wall, the first and second flaps can be folded along the third and sixth fold lines, respectively, the bottom panel can be folded along the fourth fold line to be perpendicular to the back wall and underlying the first and second flaps, and the bottom end flap can be folded back over along the fifth fold line to overlie the first and second flaps to thereby create a receptacle having three sides and a bottom platform, and the opening in the bottom end flap retains a generally spherical item supported by the bottom platform of the open sided receptacle.

4,955,530

EASY OPENING LID FOR OVENABLE CARTON

William R. Rigby, Newark, Del., and Louis C. Woyce, Jr., Downingtown, Pa., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 28, 1990, Ser. No. 500,203
Int. Cl.[5] B65D 5/54
U.S. Cl. 229—123.2 6 Claims

1. In combination, a paperboard lid having at least two adjacent side edges which meet at a ninety degree corner, an upper face and a lower face, and a tray having outwardly extending upper flanges to which the lid is adhered, the improvement comprising:

(a) a first continuous weakened score line extending around the periphery of the lid and located in the lower surface of the lid at a distance from the side edges thereof that is equal to or greater than the width of the flange of the tray to which the lid is adhered; and,

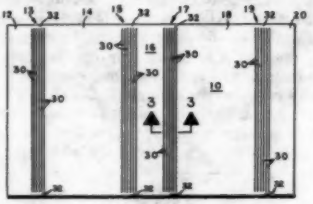
(b) a second weakened score line formed in the lower surface of the lid at the ninety degree corner of the lid and located between the outer peripheral edge of the lid and the outer edge of the flange of the tray to which the lid is adhered.

4,955,531

BLANK FOR USE IN FORMING A CONTAINER HAVING A ROUNDED EDGE

Herman Graboyes, Timberlake Apts., Apt. B-506, Norristown, Pa. 19401

Filed Feb. 21, 1989, Ser. No. 312,860
Int. Cl.[5] B65D 5/04
U.S. Cl. 229—182.1 3 Claims



1. A blank for use in forming a container having a curved edge with a longitudinal axis comprising:

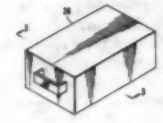
a plurality of longitudinal, substantially parallel, laterally spaced score lines for forming the edge, each of said score lines having a longitudinal axis which is substantially parallel to the longitudinal axis of said edge so that when said blank is bent about said longitudinal edge axis, said blank bends at each score line and the edge is therefore curved by virtue of the bending deflection being distributed over said plurality of score lines, the lateral spacing between adjacent score lines being varied to distribute the bending deflection unevenly for providing a curved edge having a variable radius of curvature.

4,955,532

AUTOMATIC TOLL COLLECTOR FOR A TOLL ROAD

Koichi Kanehara; Kazumi Fukuda; Masashi Sato, and Toshiaki Shimeno, all of Hyogo, Japan, assignors to Mitsubishi Jukogyo K.K., Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,423
Claims priority, application Japan, Sep. 24, 1988, 63-239339
Int. Cl.[5] G07B 15/00
U.S. Cl. 232—7 3 Claims



1. An automatic toll collector for a toll road comprising a cashbox inserted into a body of the toll collector for receiving coins thrown into a toll receiving inlet, a series of holes for an identification number formed in a bottom surface of the cashbox in a direction of inserting the cashbox to represent the identification number which identifies the cashbox, a series of holes for digit numbers disposed in a direction perpendicular to a direction of inserting the cashbox to represent a digit number of the identification number as a binary signal, a trigger hole

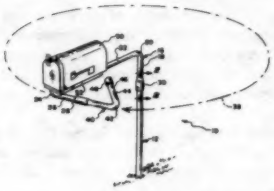
for generating a trigger signal for reading the digit number to obtain a value of the digit of the identification number, a proximity sensor for the identification number disposed at a portion facing the bottom of the cashbox of the body of the toll collector for detecting a presence of the holes for the identification number, a proximity sensor for digit numbers for detecting a presence of the holes for digit numbers to read the digit number, and a proximity sensor for trigger to detect a presence of the trigger hole and generate a trigger signal, which are disposed in a line in a direction perpendicular to the direction of inserting the cashbox whereby when the cashbox is inserted into the body or is pulled out from the body, the digit number and the value of the identification number corresponding to the digit are read each time the presence of the trigger holes is detected so that the identification number of the cashbox is read.

4,955,533

SUPPORT AND PROTECTIVE STRUCTURE FOR A MAIL BOX

Gordon Merkel, Eagle River, Wis., assignor to Boot Lake Industries, Inc., Arlington Heights, Ill.

Filed Sep. 5, 1989, Ser. No. 403,163
Int. Cl.[5] B65D *91/00*
U.S. Cl. 232—39 **11 Claims**



1. A support and protective structure for a mailbox or other similar structure, comprising a first pipe adapted to be driven into or implanted in the ground and having means at the upper end for rotatably mounting the lower end of a second pipe, a second pipe having a first pipe portion having a lower end which is adapted to be journaled to the upper end of said first pipe, said first pipe portion being adapted to extend generally upwardly from the upper end of said first pipe to a first elbow, a second pipe portion extending laterally outwardly from said first elbow in a generally horizontal direction generally laterally outwardly from said first pipe portion to an outer second elbow, and a third pipe portion extending laterally to the side from said second elbow and said second pipe portion to a third elbow, and a fourth pipe portion extending angularly from said third elbow in a direction toward said second pipe portion, said third elbow and said fourth pipe portion forming a protective shield for protecting the mailbox, at least said second pipe portion providing a support for mounting a mailbox.

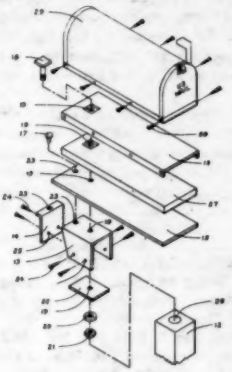
4,955,534

SWIVEL MAIL BOX

Fred A. Raible, 10283 Kasubowski Rd., Posen, Mich. 49776

Filed May 11, 1989, Ser. No. 350,752
Int. Cl.[5] B65D *91/00*
U.S. Cl. 232—39 **2 Claims**

1. A swiveable mailbox support comprising: a horizontal base plate for mounting on the top surface of a mailbox support post, said base plate including a substantially centrally located first aperture and a second aperture offset therefrom, an elongated, laminated, flat mailbox mounting plate having front and rear portions, and having a third aperture located proximate the rear portion of said mounting plate and a fourth aperture offset therefrom, pivot means passing between said first and third apertures and a shearable pin seated within said second and fourth apertures, whereby when said support is mounted on the top of a mailbox support post said shearable pin will be



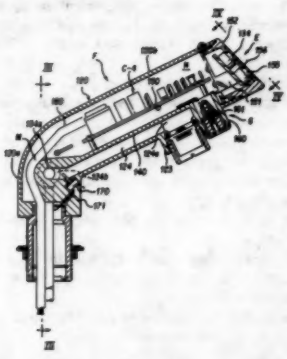
broken by the application of a predetermined force to the end of the mounting plate opposite the shearable pin.

4,955,535

AUTOMATICALLY OPERATING VALVE FOR REGULATING WATER FLOW AND FAUCET PROVIDED WITH SAID VALVE

Osamu Tsutsui; Hisato Haraga; Kinya Arita; Atsuo Makita; Hirofumi Takeuchi, and Ryoichi Tsukada, all of Chigasaki, Japan, assignors to Toto Ltd., Fukuoka, Japan

Division of Ser. No. 246,461, Sep. 19, 1988. This application Sep. 20, 1989, Ser. No. 409,918
Claims priority, application Japan, Sep. 30, 1987, 62-248944; Feb. 6, 1988, 63-26169; Feb. 23, 1988, 63-41094; Mar. 17, 1988, 63-65277
Int. Cl.[5] F16K *11/22, 11/24*
U.S. Cl. 236—12.12 **5 Claims**



1. A faucet comprising

(a) a faucet body having a proximal end adapted to receive liquid supply means, a distal end having a tap opening for liquid discharge and a water outflow passage communicating between said proximal end and said distal end,

(b) a power-operated mixing and flow regulating valve, said valve being mounted on the proximal end of said faucet body, said valve being provided with an inflow passage to

which a cold water supply pipe and a hot wate supply pipe are connected, said inflow passage communicating between said supply pipes and said water outflow passage by way of a pair of respective valve openings, opening degree of said valve openings being regulated by the reciprocation of a pair of respective valve elements,

(c) a pair of piezoelectric actuators, each independently and operably connected with a respective one of said valves, and

(d) a control device comprising a printed circuit disposed in said faucet body, said control device controlling the operation of said valve so as to effect automatic temperature control and flow rate control of mixed cold and hot water passing through said water outflow passage.

4,955,536

THERMALLY CONTROLLED VALVE

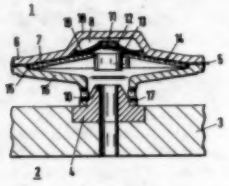
Werner Foller, Stuhr, and Holm Klaas, Bremen, both of Fed. Rep. of Germany, assignors to Gestra Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 404,278

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831474; Jul. 28, 1989, 3925032

Int. Cl.[5] G05D *23/10*; F16T *1/10*

U.S. Cl. 236—48 R **17 Claims**



8. A thermally controlled valve, in particular, a condensate drain valve, comprising:

a valve seat;

a closure valve cooperating with said valve seat;

a diaphragm capsule having a rigid wall part and a diaphragm component actuating said closure valve, said wall part and said diaphragm component being joined with each other along their outer edges and forming a reservoir therebetween for an evaporation medium;

a plate spring; and

an abutment for said plate spring;

said plate spring being supported on said abutment along its outer edge and resting against the face side of said diaphragm component which is averted from the wall part of said diaphragm capsule, the inner edge of said plate spring engaging said closure valve so as to act thereon in the opening direction;

said plate spring being a first plate spring and which further comprises:

a second plate spring resting against the face side of said diaphragm component facing the wall part of said diaphragm capsule; and

an abutment for the outer edge of said second plate spring.

4,955,537

MODEL RAILROAD TRACK HAVING A TRACK BED

Matjaz Bratovz, Salzburg, Austria, assignor to Elfriede Rösler, Salzburg, Austria

Filed Jan. 30, 1989, Ser. No. 303,462

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1988, 3840952

Int. Cl.[5] E01B *23/00*

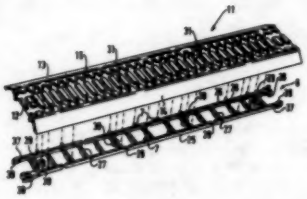
U.S. Cl. 238—10 B **23 Claims**

1. A model railroad system having a track bed which simulates a railroad superstucture of the type provided with a ballast bed, which comprises:

an elongated track bed section constructed of a deformable material,

an elongated support member extending along each side of said bed section and inclined downwardly and away from said bed section to provide support therefor, said support members being substantially equal in length such that said track bed has substantially an isosceles trapezoidal cross-sectional configuration less the closing longer side,

a plurality of recesses provided in the upper surface of said track bed section,



a track grate having a plurality of tracks and ties configured, dimensioned and arranged to complement said plurality of recesses provided in said track bed section so as to be positionable thereon and inserted into said recesses a depth corresponding substantially to the thickness of the track ties,

stiffener means having a ladder-like configuration and positioned on the bottom surface of said bed section, said stiffener means having a stiffness greater than the stiffness of said bed section,

a plurality of receptacles provided on the bottom surface of said bed section for reception of at least portions of said stiffener means to facilitate attachment of said stiffener means to said bed section.

4,955,538

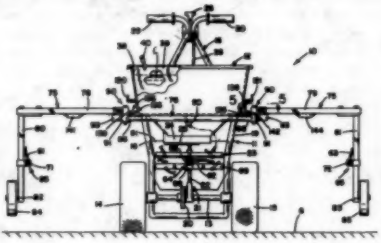
APPLICATOR AND METHOD FOR THE DELIVERY OF GRANULAR AND LIQUID PRODUCTS TO TURF AREAS

Mark E. Laube, Copley, and J. Martin Erbaugh, Hudson, both of Ohio, assignors to Erbaugh Corporation, Hudson, Ohio

Filed Oct. 4, 1989, Ser. No. 416,917

Int. Cl.[5] A01C *15/00, 19/04*; B05B *1/20*

U.S. Cl. 239—1 **25 Claims**



21. A method for the uniform and simultaneous delivery of dry and liquid materials to turf areas employing an applicator having a hopper for said dry materials and a sealed reservoir for said liquid materials; means for broadcasting said dry materials from said hopper and first and second nozzle means for the application of said liquid materials directly to the ground,

said second nozzle means being mounted to extendible boom means, said method comprising the steps of:

filling the hopper with desired dry materials and the reservoir with desired liquid materials;

moving said second nozzle means laterally away from the hopper and to the front of the applicator;

activating a lever to commence delivery of the dry materials and the liquid materials simultaneously;

selectively controlling the application of the liquid materials by moving a first switch means from a first position, in which the liquid materials are delivered continuously with the dry materials, to a second position in which delivery of the liquid materials is prohibited; and

selectively activating a second switch means between on and off positions, when said first switch means is in said second position, thereby providing spot spraying of the liquid materials through said first and second nozzle means.

4,955,539

METHOD AND APPARATUS FOR CONVERTING PRESSURIZED LOW CONTINUOUS FLOW TO HIGH FLOW IN PULSES

Gideon Ruttenberg, 81465 Date Palm Dr., Indio, Calif. 92201

Filed May 1, 1989, Ser. No. 345,661

Int. Cl.[5] B05B *1/08*

U.S. Cl. 239—1 **29 Claims**

1. Apparatus for converting pressurized low continuous liquid flow to a high intermittent pulsating flow which comprises a pressure container having a low elasticity, means for supplying a continuous flow of liquid thereto at a controlled low flow rate and thereby establishing a pressurized body of liquid within said container, a pre-set normally closed check valve connected to an outlet from said container, said check valve remaining closed and preventing a liquid from flowing out of the pressure container at a lower pressure and opening at a pre-set higher pressure at which liquid flows out of the container and closes itself at said lower pressure, whereby the outlet from the pressure container will remain closed until liquid flowing into the container causes pressure within the container to increase and the pre-set check valve to re-open thus allowing for a volume of the liquid that was accumulated in the container when pressure was increased, to be ejected through the container outlet and the pre-set check valve, conduit means connected to the outlet of said pre-set valve, means associated with said conduit means providing sufficient resistance to liquid flow to force said pre-set check valve, when it opens, to become widely open, thus allowing for liquid at a high rate of flow to be ejected from said container thereby causing the volume and pressure of the liquid within the container to decrease and said pre-set check valve to close, said pre-set check valve having a quick response as a result of said resistance whereby a "Water Hammer" effect is created thus causing the liquid to be ejected at a higher pressure and velocity than that of the incoming liquid flow.

4,955,540

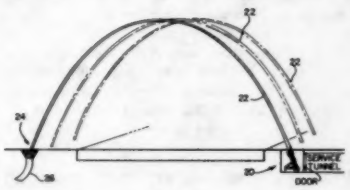
WATER DISPLAYS

Mark W. Fuller, Studio City, and Alan S. Robinson, El Monte, both of Calif., assignors to WET Enterprises, Inc., Universal City, Calif.

Filed Feb. 26, 1988, Ser. No. 160,720

Int. Cl.[5] B05B *17/08*

U.S. Cl. 239—20 **13 Claims**



1. A water display comprising:

a source of water under pressure;

a laminar flow nozzle disposed to direct a laminar flow stream of water therefrom in a trajectory for viewing by observers of the water display; and,

control means for controllably varying the trajectory of the stream of water by varying the position of said laminar flow nozzle simultaneously with the variation of the angular elevation thereof, whereby the laminar flow stream will pass approximately through a first fixed point in space spaced from said laminar flow nozzle outlet independent of the reasonable variation of the local angular elevation of the laminar flow stream, whereby a dynamic water display is created.

4,955,541

TWO DIMENSIONAL NOZZLE FOR A TURBOJET ENGINE

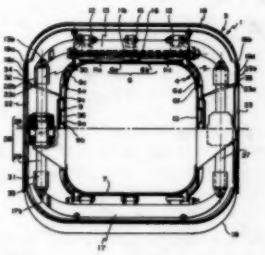
Olivier Carteron, Maisse, and Gérard E. A. Jourdain, Corbeil Essonnes, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.-M.A., Paris, France

Filed Sep. 15, 1989, Ser. No. 407,908

Claims priority, application France, Sep. 28, 1988, 88 12648

Int. Cl.[5] F02K *1/12*

U.S. Cl. 239—127.1 **9 Claims**



1. A two dimensional nozzle for a turbojet engine having a gas exhaust duct with a downstream end comprising:

(a) a pair of stationary, opposite lateral wall structures, defining the lateral boundaries of the nozzle, each having an interior wall and an exterior wall defining a space therebetween;

(b) a pair of movable, opposite flap assemblies extending between the lateral wall structures to define the upper and

lower boundaries of the nozzle, each movable flap assembly comprising:

(i) an interior flap pivotally attached to the downstream end of the exhaust duct;

(ii) an exterior flap located outwardly of the interior flap and pivotally connected to the downstream end

(iii) a rocking lever connected to the downstream end of the exhaust duct; and

(iv) connecting means connecting the rocking lever to the interior and exterior flaps; and,

(c) jack screw actuators interconnecting the rocking levers to form a rigid frame around the nozzle such that movement of the jack screw means causes generally transverse movement of the rocking levers to vary the angular orientation of the interior and exterior flaps.

4,955,542

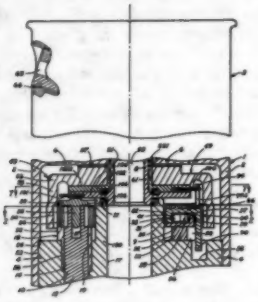
REVERSING TRANSMISSION FOR OSCILLATING SPRINKLERS

Carl L. C. Kah, Jr., 778 Lakeside Dr., North Palm Beach, Fla. 33408

Filed Sep. 15, 1988, Ser. No. 245,126

Int. Cl.[5] B05B *3/16*

U.S. Cl. 239—242 **19 Claims**



1. An oscillating transmission for use with an oscillating sprinkler head having an output gear, a gear cage means with two drive gears, a first drive gear and a second drive gear for alternately driving said output gear to oscillate it, means mounting said gear cage means for movement, reversing toggle means mounted for movement adjacent said gear cage means, a single interacting overcenter biasing means mounted between said reversing toggle means and said gear cage means for biasing said gear cage means and said reversing toggle means in the same direction on opposite sides of a center position for driving said output gear by said gear cage means, means for moving said reversing toggle means to move it over its center position to bias said gear cage means and said reversing toggle means in the opposite direction, said means for moving said reversing toggle means being connected to said output gear.

4,955,543

VEHICLE PANE WASHING APPARATUS, PARTICULARLY FOR HEADLIGHT DIFFUSING LENSES

Peter Orth, and Ulrich Witt, both of Lippstadt, Fed. Rep. of Germany, assignors to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed Aug. 14, 1989, Ser. No. 394,063

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828999

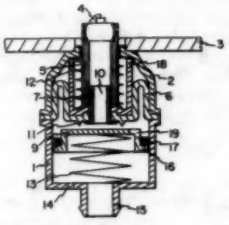
Int. Cl.[5] B60S *1/48, 1/56*

U.S. Cl. 239—284.2 **10 Claims**

1. In a pane washing apparatus for vehicles including in particular a spraying type apparatus of the type comprising a jet nozzle which is driven against spring force from a pulled-back rest position to a deployed position by means of a jet-nozzle carrier which is acted upon by pressurized cleaning fluid, said spraying type apparatus further comprising a valve that is only opened once the jet-nozzle carrier is in the deployed position;

the improvement wherein:

the jet-nozzle carrier defines therein a passage opening leading to the jet nozzle;



the said valve includes a cap for being pressed against the jet nozzle carrier to close said passage opening, said cap following the movement of the jet-nozzle carrier toward a deployed position; and

a stop means for contacting said cap shortly before said jet nozzle reaches said deployed position to open said passage opening and thereby allow flow of pressurized cleaning fluid to said jet nozzle.

4,955,544

DOSAGE GUN

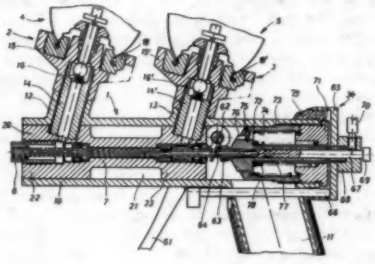
Volker Kopp, Esslingen, Switzerland, assignor to C. Ehrensperger AG, Erlenbach, Switzerland

Filed Apr. 14, 1988, Ser. No. 181,653

Claims priority, application Switzerland, Apr. 16, 1987, 1501/87

Int. Cl.[5] B05B *7/12*

U.S. Cl. 239—304 **18 Claims**



14. A dosage gun for producing a multi-component material, comprising:

a housing having a longitudinal bore therein which terminates at one end in an emission nozzle;

at least two pressure tanks, each containing one component of the multi-component material, each tank being selectively connectable to said housing, wherein each tank has a discharge valve for selectively discharging its component into said housing longitudinal bore; and,

a dosage device held in said housing longitudinal bore for dispensing the components in a predetermined proportion by volume, said dosage device comprising at least one

hollow needle which is movably mounted in relation to said emission nozzle so that the components of the material are fed along an exterior periphery and through an interior bore, respectively, of said at least one hollow needle and wherein the components are dispensed at said emission nozzle as co-axial streams which flow into each other and a dosage needle arranged within said hollow needle, said dosage needle being movable in relation to said hollow needle in order to feed the components of the material to said emission nozzle, and wherein said dosage needle is rotatable in relation to said hollow needle in order to adjust the rate of feed to said emission nozzle; and,

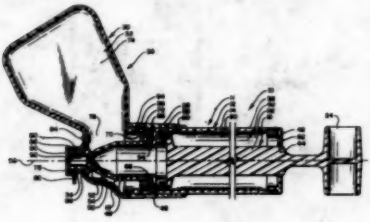
first and second set back mechanisms which each include a spring that sets back a respective one of said hollow needle and said dosage needle into the rest position.

4,955,545

MANUALLY ADJUSTABLE SPRAY APPLICATOR

Donald J. Stern; Jeff S. Heaton, both of Bellingham; James A. Tryon, Seattle, and Brett A. Bartholmey, Bellingham, all of Wash., assignors to DJS&T Limited Partnership, Bellingham, Wash.

Filed Mar. 10, 1989, Ser. No. 321,759
Int. Cl.[5] B05B *7/24*
U.S. Cl. 239—320 **14 Claims**



1. A spray applicator to discharge a fluid material in a spray pattern by means of pressurized air, said applicator comprising:

a. a housing structure having a longitudinal axis and comprising:

i. an air pressurizing section defining an air chamber;

ii. an air nozzle section connected to a forward end of said air pressurizing section and providing an air nozzle aligned with said longitudinal axis and arranged to receive pressurized air from said air chamber and discharge said air forwardly;

b. a manually operated piston member mounted in said air chamber for reciprocating motion to provide pressurized air in said air chamber;

c. a fluid discharge structure comprising:

i. a fluid nozzle section providing a fluid discharge nozzle positioned on said longitudinal axis forwardly of said air nozzle and arranged to receive an air jet from said air nozzle and discharge fluid and air in a forward direction;

ii. a mounting section to which said fluid nozzle section is mounted and which is in turn rotatably mounted to said housing structure in a manner that said fluid discharge structure and said housing structure are primarily positioned and supported relative to one another by said mounting section, and also interconnected by helical guide means so as to be movable axially by relative rotation therebetween between a forward position where said fluid nozzle is spaced a further distance forwardly of the air nozzle and through intermediate positions to a rear position where said fluid discharge nozzle is closely adjacent to said air nozzle;

d. a fluid containing means mounted to said fluid discharge structure and adapted to contain said fluid material for entry through a fluid discharge region adjacent to said fluid discharge nozzle.

e. said housing structure and said mounting section each having exterior manually engagable surface portions by which said housing structure and said mounting section can be manually rotated to move said nozzle toward and away from one another.

4,955,546

WATER JET GUN

Maw-Shinn Liaw, 69-2, Sec. 2, Chien-Kuo Rd., Min-Hsiung Hsiang, Chia-yi Hsien, Taiwan

Filed Aug. 4, 1989, Ser. No. 389,573
Int. Cl.[5] B05B *1/30*
U.S. Cl. 239—440 **3 Claims**

1. A water jet gun comprising:

a gun-like body having a handle portion with an inlet end and a tubular housing portion transverse to said handle portion, said tubular housing portion having a front end, a rear end, and a tubular wall with a first opening which is communicated with the interior of said handle portion;

a hollow plug movably received in said tubular housing portion and having a front outlet end which extends out of said front end of said tubular housing portion, a rear end which extends out of said rear end of said tubular housing portion, and a tubular wall which is in contact with said tubular wall of said tubular housing portion and which has a second opening, said hollow plug being operable to rotate relative to said tubular housing portion between a first position in which said first and second openings communicate with one another to form a flow passage and a second position in which said first and second openings do not intercommunicate, said second opening being tapered in an annular direction of said hollow plug from one end of said second opening to another opposite end thereof so that the dimension of said flow passage is variable upon rotation of said hollow plug;

a sealing means provided around said hollow plug;

a spout connected to said front outlet end of said hollow plug;

a spout housing having a first enlarged front hollow portion which has a foremost second enlarged hollow portion broader than said first enlarged hollow portion, said first enlarged hollow portion having an outer periphery which is provided with a first screw thread, said second enlarged hollow portion having an inner periphery provided with a plurality of grooves, said spout further having a restricted rear hollow portion which is connected to said front outlet end of said hollow plug, said restricted hollow portion having a nozzle member extending therefrom into said first enlarged hollow portion, said nozzle member having a tube wall provided with a plurality of annularly spaced peripheral openings and a front outlet end,

a hollow head movably provided in said first enlarged hollow portion, having an outer annular wall, an inner annular wall within said outer annular wall, a perforated cover plate which is connected to the front ends of said outer and inner annular wall and which has a central first open-

ing and a plurality of second openings around said central opening, and a first annular flange which projects forwardly and flares outwardly from said front end of said outer annular wall and extends outwardly of said first enlarged hollow portion, said first annular flange having a plurality of third openings around said perforated cover plate, said first enlarged hollow portion, said perforated plate, said outer annular wall and said inner annular wall confining a pressure chamber anterior to said restricted hollow portion, said nozzle member extending into said inner annular wall passing through said pressure chamber,

a first sealing ring provided between said inner annular wall and said nozzle member,

a second sealing ring provided around said outer annular wall of said head,

an adjustment ring member provided around said first enlarged hollow portion and having a second screw thread to engage with said first screw thread, said adjustment ring member being cooperatively associated with said first annular flange and capable of moving said head relative to said spout housing when said adjustment ring member is turned relative to said spout housing,

the position of said second sealing ring being changeable between a first position, in which said second sealing ring is in an annular space between said second enlarged hollow portion and said outer annular wall, permitting a fluid flow between said annular space and said pressure chamber, and a second position, in which said second sealing ring is in between said first enlarged hollow portion and said outer annular wall, interrupting the communication between said annular space and said pressure chamber,

the position of said inner annular wall relative to said nozzle member being changeable between a third position in which said first sealing ring of said inner annular wall is anterior to said peripheral openings of said nozzle member, sealing off the fluid communication between said peripheral openings and said inner annular wall and a fourth position in which said inner annular wall surrounds said peripheral openings.

4,955,547

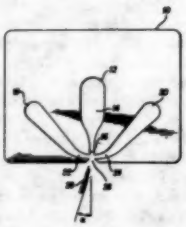
FLUIDIC OSCILLATING NOZZLE

Robert L. Woods, Arlington, Tex., assignor to Spectra Technologies, Inc., Arlington, Tex.

Continuation of Ser. No. 92,186, Sep. 2, 1987, Pat. No. 4,905,909. This application Aug. 24, 1989, Ser. No. 398,374

Int. Cl.[5] B05B *1/08*

U.S. Cl. 239—589.1 **1 Claim**



1. A fluidic oscillating nozzle for generating a zero-degree jet through a first nozzle means without the need for a feedback passage downstream of the nozzle, comprising:

a supply port operatively connected to a first fluid flow passage converging to a first throat portion;

first nozzle means for generating a zero-degree jet of fluid, said first nozzle means located downstream of said first fluid flow passage and said first throat portion; and

control means including a first control nozzle for projecting a first jet of fluid substantially transverse to and substantially in the same plane as the flow of said zero-degree jet and a second control nozzle for projecting a second jet of fluid substantially transverse to and substantially in the same plane as the flow of said zero-degree jet, said first and second control nozzles positioned one on either side of said first throat portion whereby said control nozzles allow proportional deflection of said zero degree jet and whereby there is no wall attachment of the zero degree jet downstream of said first nozzle means.

4,955,548

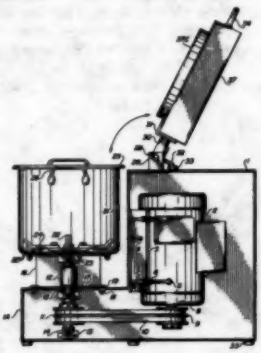
METHOD AND APPARATUS FOR COMMINUTING CREMATION REMAINS

Paul F. Rahill, Longwood, Fla., assignor to Industrial Equipment & Engineering Company, Orlando, Fla.

Filed Oct. 13, 1989, Ser. No. 421,524

Int. Cl.[5] B02C *13/26*

U.S. Cl. 241—30 **15 Claims**



1. A method for comminuting cremation remains comprising the steps of:

providing a unitary processing drum having a comminuting blade therein;

initially cremating the remains and then placing the cremated remains within the processing drum;

providing a remains ashpan having an opening with dimensions greater than the processing drum and fitted over the drum opening;

placing the remains in the ashpan after the initial cremation;

transferring the remains into the drum from the ashpan;

rotating the comminuting blade within the drum to comminute the remains; and then

removing the remains from the drum.

4,955,549

APPARATUS FOR TREATMENT OF FIBRE SUSPENSIONS

Rolf B. Reinhall, Belleveu, Wash., assignor to Sunds Defibrator Aktiebolag, Sweden

PCT No. PCT/SE87/00341, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/00992, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 20, 1987, Ser. No. 303,665

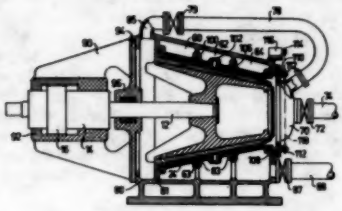
Claims priority, application Sweden, Aug. 7, 1986, 8603346

Int. Cl.[5] B02C *19/00*

U.S. Cl. 241—80 **15 Claims**

1. An apparatus for treating a fibre suspension comprising a housing having an inlet and an outlet, a rotor having an outer surface arranged within said housing, a first plurality of treating members arranged over the outer surface of said rotor, a stator having an inner surface surrounding said rotor within

said housing, a second plurality of treating members arranged over the inner surface of said stator, the inner surface of said stator cooperating with the outer surface of said rotor to define a refining gap therebetween for the treatment of fibre suspension being supplied thereto by the cooperation of the first and second plurality of treating members, a portion of said stator including a plurality of screening apertures therein to permit the outward passage therethrough of at least a portion of the fibre suspension being treated within said refining gap for



discharge from said apparatus through said outlet of said housing, said plurality of screening apertures being at least coextensive with said first plurality of treating members arranged over the outer surface of said rotor, said refining gap providing a first treating zone having an inlet and a second treating zone having an outlet arranged along a portion of the length of said rotor, and adjusting means for adjusting the width of the refining gap within the first treating zone independently of the width of the refining gap within the second treating zone.

4,955,550

QUANTITATIVE FEEDING APPARATUS USABLE FOR PULVERIZED AND/OR GRANULAR MATERIAL AND BATCH TYPE MULTI-COLORED AUTOMATIC FEEDING APPARATUS

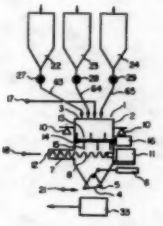
Hideo Satake, Toyota; Hideo Shimizu, and Hozumi Tanaka, both of Tokyo, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi and Toyo Ink Mfg. Co., Ltd., Tokyo, both of, Japan

Filed Nov. 3, 1988, Ser. No. 266,906

Claims priority, application Japan, Nov. 7, 1987, 62-281773; Jun. 13, 1988, 63-145063

Int. Cl.[5] B02C *19/00*

U.S. Cl. 241—101.4 **1 Claim**



1. A master batch type multi-colored automatic feeding apparatus comprising a quantitative feeding apparatus, an amount of master batch to be supplemented to a barrel portion of said quantitative feeding apparatus being automatically controlled by measuring a predetermined amount of master batch stored in a plurality of master batch storage hoppers, said quantitative feeding apparatus comprising a feeder for mechanically feeding said predetermined amount of master batch from said barrel portion through a feeding portion out of said barrel portion, said master batch type multi-colored automatic feeding apparatus further comprising a pneumatic conveyor for conveying the master batch fed from said feeding portion to a molding machine, a separator disposed above said molding machine to separate air from solid material, a mixer including a raw material feeding portion for said molding machine in which the master batch which has fallen down after completion of separation of air from solid material is mixed with a natural resin, and selecting and returning means for selecting the kind of master batch discharged from a discharging portion on the bottom part of the quantitative feeding apparatus to be returned to the same kind of hopper among said plurality of storage hoppers and then returning it thereto, wherein a supplementing port through which the master batch is supplemented is provided on the upper end of said barrel portion, said feeding portion through which the master batch is fed is provided at an intermediate part of the barrel portion and wherein a plurality of cleaning nozzles are provided for washing said supplementing port, said feeding portion and said discharging portion.

4,955,551

INTERMITTENT EPICYCLIC MILL

Vitaly V. Jurisov, Tsvetnoi proezd, 17, kv. 40, Novosibirsk, U.S.S.R.

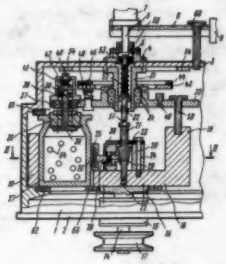
PCT No. PCT/SU88/00161, § 371 Date Apr. 20, 1989, § 102(e) Date Apr. 20, 1989, PCT Pub. No. WO89/01363, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 19, 1988, Ser. No. 348,007

Claims priority, application U.S.S.R., Aug. 20, 1987, 4296981

Int. Cl.[5] B02C *17/08*

U.S. Cl. 241—175 **11 Claims**



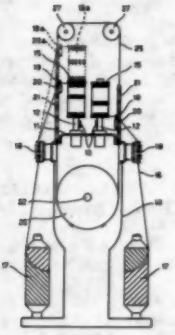
1. An intermittent epicyclic mill incorporating a housing (1) with a cover (3) which is supported by a baseplate (2) and wherein located in said housing are barrels (27) closed by lids and containing each a load of pebbles (64), the barrels (27) resting on an electrically-driven carrier (18) and revolving both about their own axes and an axis of the mill, characterized in that a rigid mount (10) is immovably located in the housing (1) in a coaxial position with the carrier (18) so as to form a clearance with the housing (1) and restrict the barrels (27) which are pressed against the rigid mount (10) by load-bearing elements fitted to the carrier (18), and a revolving jib crane (9) is secured to the baseplate (2), the jib crane carrying a ram (7) suspended therefrom in a coaxial position with the mill, the ram having a piston rod (6) rigidly attached to the cover (3) of the housing (1), the inside of the cover having a spindle (31) rigidly fastened thereto so as to give support to a lower disc (33) and an upper disc (43) installed in bearings (34) one above the other, the lower disc (33) is fitted with provision for revolving integrally with the lids of the barrels (27), and the upper disc (43) is installed with provision for an axial displacement with respect to the lower disc (33) and has spring-loaded pins (45) passing through holes in the lower disc (33) so as to come abutting against top end faces of the barrels (27), and rams (46) are fitted to the cover (3) of the housing (1) with provision for interacting with the upper disc (43) when the

cover (3) of the housing (1) is being lifted by the ram (7) of the revolving jib crane (9).

4,955,552
YARN WINDING MACHINE

Carlo Meneguzzo, Via Spreafico No. 3, Monza, Milano, Italy

Filed Nov. 27, 1989, Ser. No. 441,256
Claims priority, application Italy, Oct. 25, 1989, 22130 A/89
Int. Cl.[5] B65H *54/20, 54/30*
U.S. Cl. 242—35.5 R **8 Claims**

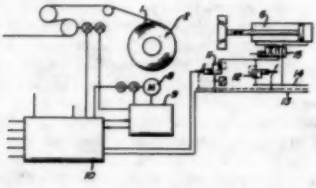


1. A yarn winding machine of the type comprising a spindle-holding frame for at least a first set of spindles rotatably supported and longitudinally aligned on said frame, the winding machine also comprising movable yarn guide members for the yarn to be wound onto at least one bobbin associated with each single spindle, and drive means for reciprocating said yarn guide members, each yarn guide member being provided on a respective slidable support element, a separate guide means for each said slidable support element, each said guide means being arranged parallel to and on one side of a respective spindle and a reciprocable drive means operatively connected to each yarn guide support element.

4,955,553
COILING REEL

Oskar Noé; Rolf Noé; Andreas Noé, and Herbert Lux, all of Mülheim, Fed. Rep. of Germany, assignors to BWG Bergwerk- und Walzwerk-Maschinenbau GmbH, Duisberg, Fed. Rep. of Germany

Filed Aug. 14, 1989, Ser. No. 393,587
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827429
Int. Cl.[5] B65H *75/24*
U.S. Cl. 242—63 **3 Claims**

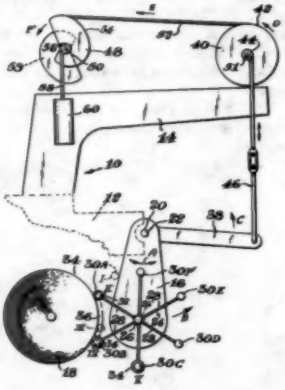


1. In a reel for coiling and uncoiling strips, the reel including an expanding mandrel for the coil to be received, the expanding mandrel having at least shell-like spreading members, a spreader rod and spreading elements arranged between the spreading members and the spreader rod, a spreader cylinder being connected to the spreader rod, the expanding mandrel being driven by a drive motor with a control and computer unit for maintaining a predetermined winding pull and for determining the outer diameter of the coil at any given moment, the improvement comprising the control and computing unit comprising a microprocessor for determining at least the initial spreading pressure for the expanding mandrel and the winding pull to be maintained in dependence upon introduced parameters which are specific to the strips being coiled, the microprocessor including means for introducing the winding pull into the control and computing unit and for receiving from the control and computing unit the outer diameter of the coil at any given time and for determining the spreading pressure required at any given time in dependence upon the outer diameter of the coil, a pressure regulating valve controlled by the microprocessor for continuously readjusting the spreading pressure in the spreading cylinder, such that the spreading pressure in the spreading cylinder is the same as the spreading pressure continuously determined by the microprocessor.

4,955,554
FILM WINDER

William E. LeBoeuf, and H. V. Walt, Jr., both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 12, 1988, Ser. No. 242,590
Int. Cl.[5] B65H *18/16*
U.S. Cl. 242—65 **10 Claims**



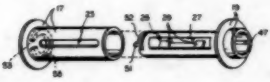
1. Film winding apparatus comprising a bed roll, a turret carrying indexing mandrels for containing rolls of film, means adjustably pivoting said turret such that said mandrels and their contents engage said bed roll along a winding path, adjustable means connecting said turret so that when it is rotated about its pivot forces incident thereto are transmitted to a ratio multiplying means, said ratio multiplying means being linked with a balancing cam having a varying radius, said cam carrying a counterforce mechanism whereby engagement of one of said mandrels with the bed roll transmits the incident forces to the ratio multiplier and balancing cam such that the incident forces between the bed roll and each mandrel and its contents are minimized during the operation of the winding apparatus.

4,955,555

LEADER-RETRACTING FILM MAGAZINE AND METHOD FOR ENCLOSING FILM

Charles W. Pierson, Rochester, and Frederick F. Tone, Holley, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1983, Ser. No. 547,310
Int. Cl.[5] B65H 75/28
U.S. Cl. 242—74 10 Claims



1. A magazine for light-sensitive film, said magazine comprising:

a casing having a light-tight slot through which film may exit said casing;

a spool rotatably mounted in said casing;

a leader extending through said slot, said leader having a first end inside said casing attached to at least a portion of said spool and a second end outside said casing adapted to be attached outside said casing by a splice to the film so that rotation of said spool portion relative to said casing winds said leader about said spool portion, whereby the splice is retracted into said casing; and

means for retaining said leader wound about said spool portion to inhibit pulling the splice out of said casing, whereby said leader is inhibited from being withdrawn from within said casing.

4,955,556

SHOULDER HARNESS REEL ASSEMBLY WITH AUTOMATIC REEL LOCK

Don L. Frisk, Yorba Linda, Calif., assignor to PZF, Inc., Yorba Linda, Calif.

Division of Ser. No. 103,414, Oct. 1, 1987, Pat. No. 4,801,105.
This application Jan. 30, 1989, Ser. No. 304,342
Int. Cl.[5] B60R 22/38; G05G 1/00
U.S. Cl. 242—107.4 B 2 Claims

1. An improved dog of the type used with a ratchet, which ratchet is subject to rapid withdrawal, said dog having a pivot point at its base and a ratchet contacting face at the tip thereof and a ratchet directed face extending generally in the direction of the pivot point from the edge of the ratchet contacting face, said dog including biasing means urging said dog in the direction that causes said ratchet contacting face to contact a ratchet wherein the improvement including means to reduce or eliminate the tendency of the tip to bounce along the teeth of the ratchet when it is rapidly turning, said improvement comprising:

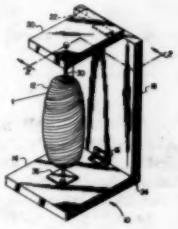
a biased probe extending outwardly from the ratchet contacting face, said biased probe having a ratchet directed edge closest to the ratchet and the ratchet directed edge being aligned with the ratchet directed face of the dog and said biased probe being inwardly movable into said dog so that its tip is in line with the ratchet contacting face whereby a timed entry of the dog into contact with a ratchet occurs in that if the dog has time to make a complete engagement with a ratchet tooth, it is allowed to drop but if it does not, the dog is held up by said probe until the next tooth comes around.

4,955,557

HANDCRAFT YARN DISPENSER

Virgil L. Sewell, and Martha A. Sewell, both of 1150 N. Canterbury Ct., Dallas, Tex. 75208

Filed Feb. 9, 1990, Ser. No. 477,570
Int. Cl.[5] B65H 49/30, 49/32
U.S. Cl. 242—134 4 Claims



1. A handcraft device for dispensing yarn, thread and the like from a skein, comprising:

a base having a recess therein to be positioned opening upward;

an upright, attached to one side of the base, to be positioned extending vertically, upwards of the base;

means for fixing the position of the upright with respect to the base;

a spindle support having a recess therein to be positioned opening downward;

a spindle sufficiently slender to pass through the skein;

means for attaching the spindle support at one side thereof to the upright near the top thereof and for providing rotation of the spindle support in a vertical plane to a position wherein the spindle support recess is above the base recess so that the spindle can be mounted with one end thereof in the spindle support recess and the other end thereof in the base recess, said provided rotation including rotation of the spindle support upwards from said one end of the spindle sufficiently to allow the spindle to be inserted and removed from said recesses; and

a spacer means attached to the spindle near said other end thereof for spacing the skein from the base.

4,955,558

REACTION CONTROL SYSTEM

Anthony Machell, and Peter G. Foulsham, both of Stevenage, England, assignors to British Aerospace Public Limited Company, London, England

Filed Feb. 10, 1989, Ser. No. 308,460
Claims priority, application United Kingdom, Feb. 11, 1988, 8803164
Int. Cl.[5] F42B 10/66
U.S. Cl. 244—3.22 9 Claims

1. A projectile including a reaction control system, said system including at least one nozzle assembly, said at least one nozzle assembly comprising a housing defining a nozzle outlet means and a bore adjacent said outlet, a piston means located in said bore and movable to open or to close said nozzle outlet

means, drive means for moving said piston means and passage means extending through said piston means whereby the pressure at one end of said piston and means is transmitted to the other end thereof.

4,955,559

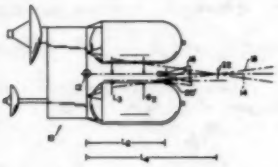
THRUST VECTOR CONTROL SYSTEM FOR AEROSPACE VEHICLES

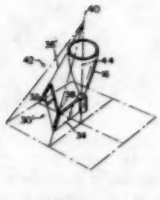
Rimvykas A. Kaminskas, Palos Verdes Estates, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jan. 26, 1988, Ser. No. 148,563

Int. Cl.[5] B64L *15/12*

U.S. Cl. 244—52 **10 Claims**





1. A thrust vector control system for an aerospace vehicle propelled by a reaction motor, comprising:

means for simultaneously rotating and laterally translating the reaction motor with respect to an axis of the vehicle to provide increased control moments over simple rotation or translation of the reaction motor for improved steering and controlling of the vehicle.

4,955,560

ELECTRO MOTOR HELICOPTER

Edward T. Nishina, 78-6401 Mamalahoa Hwy., Holualoa, Hi. 96725, and George Spector, 233 Broadway Rm 3815, New York, N.Y. 10007

Filed Mar. 30, 1989, Ser. No. 330,646

Int. Cl.[5] B64D *37/00*

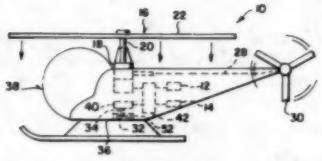
U.S. Cl. 244—53 R **4 Claims**

1. An electromotor helicopter having a fuselage and drive assembly further comprising:

(a) a pair of batteries in which said first battery is used as a source of electrical energy to supply power to said drive assembly of the helicopter while said second battery is held in reserve to be recharged;

(b) a propeller having a drive shaft rotatably mounted on said fuselage;

(c) a generator mechanically connected to said drive shaft and electrically connected to said second battery so that a downward maneuvering of the helicopter will cause said propeller to turn said drive shaft to operate said generator for recharging said second battery; and



(d) means for changing the electrical positions of said batteries so that said second battery can now be electrically connected to the drive assembly while said first battery can now be placed in reserve to be recharged by said generator.

4,955,561

COGWHEEL DRIVE MECHANISM FOR AIRCRAFT

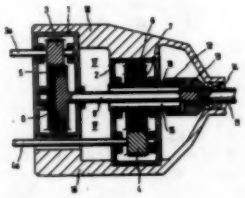
U. C. Seefluth, Dornburg, Fed. Rep. of Germany, assignor to U. Christian Seefluth, Dornburg, Fed. Rep. of Germany

Filed Aug. 31, 1987, Ser. No. 91,273

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629867

Int. Cl.[5] B64D *35/08*

U.S. Cl. 244—60 **15 Claims**



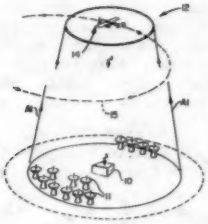
1. A gear drive arrangement for driving one aircraft propeller or helicopter rotor comprising: two transmissions with two laterally displaced drive shafts and at least one driven shaft connected to a propeller shaft or rotor shaft; said two transmissions comprising two spatially separated individual drive mechanisms; a separate housing for each of said drive mechanisms and housing sections of said driven shaft; each of said drive mechanisms having one of said two drive shafts so that the propeller or rotor is assuredly always driven by one of said drive shafts, all said shafts having longitudinal axes, said two driven shafts and said propeller or rotor shaft being arranged one behind the other in predetermined sequence along said longitudinal axes.

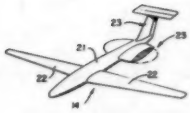
4,955,562

MICROWAVE POWERED AIRCRAFT

John E. Martin, Ottawa; James D. DeLaurier, Concord; George W. Jull, and Arne Lillemark, both of Nepean, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Communications, Ottawa, Canada

Filed Nov. 16, 1988, Ser. No. 272,015
Claims priority, application Canada, Nov. 24, 1987, 552664
Int. Cl.[5] B64C *39/02*
U.S. Cl. 244—62 16 Claims





1. A microwave-powered aircraft, comprising:

means for propelling the aircraft;

means defining lifting surfaces on the aircraft for exerting lifting forces on the aircraft in response to the propulsion of the aircraft;

means for receiving and rectifying microwave energy transmitted to the aircraft from a location remote from the aircraft;

the means for propelling the aircraft being operable in response to the microwave energy received by the microwave energy receiving and rectifying means; and

the microwave energy receiving and rectifying means comprising a rigid body of substantially circular plan form attached to the aircraft, the horizontal dimensions of the body being a substantial fraction of the aircraft wingspan and the body being relatively shallow with a periphery which is vertically curved so as to reduce turbulence in the airstream over the body during flight, and the body being separate from the lifting means and shaped to at least substantially avoid the generation of lifting forces by the body;

a plurality of downwardly-facing microwave antennas and associated rectifying elements at the underside of the body; and

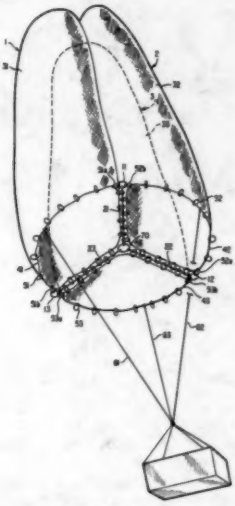
microwave reflector means provided in the body above said microwave antenna for shielding a space located above said microwave reflector means and within the body from microwave radiation.

4,955,563

APPARATUS AND METHOD FOR CONTROLLED SIMULTANEOUS OPENING OF CLUSTERED PARACHUTES

Calvin K. Lee, Needham, and James E. Sadeck, East Freetown, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 25, 1989, Ser. No. 401,192
Int. Cl.[5] B64D *17/36*
U.S. Cl. 244—152 8 Claims



1. A parachute assembly for the controlled airdrop of a payload, comprising:

a. a cluster of parachutes, each of said parachutes comprising;

(i) a canopy with a skirt portion located at the peripheral edge of said canopy,

(ii) a plurality of reefing control rings that are attached at points of attachment that are substantially equidistant from each other on said skirt portion, and

(iii) a plurality of suspension lines that are each attached to said skirt portion at one end and attachable to a payload at the other end; and

b. a control means common to the canopy of each said parachute for releasably connecting each said parachute to each other parachute, wherein said control means comprises;

(i) a common member disposed between and intermediate each said skirt portion of said parachute cluster,

(ii) a plurality of control lines that are attached to said common member at points of attachment that are substantially equidistant from each other on said common member, each of said control lines being threaded through a plurality of said reefing rings on confronting skirt portions of each of two adjacent parachutes, each of said control lines extending along a substantial portion of the periphery of each of said confronting portions of said adjacent parachutes not above about 50 percent of the said periphery, and

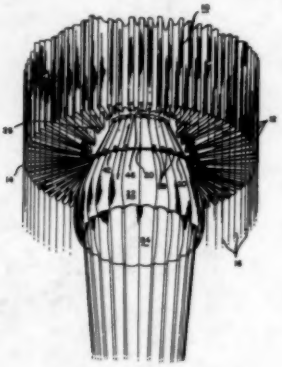
(iii) at least one control member that is breakable under tension forces generated at the skirt portion during canopy opening, and that is attached to each of said control lines at a point remote from said common member, each said control member being threaded through at least one reefing ring on each of two adjacent parachutes.

4,955,564

MAIN PARACHUTE APPARATUS WITH SECONDARY PARACHUTE FOR AIDING INITIAL INFLATION THEREOF

James D. Reuter, Manchester, Conn., assignor to Pioneer Aerospace Corporation, South Windsor, Conn.

Filed Jun. 1, 1989, Ser. No. 359,599
Int. Cl.[5] B64D *17/04, 17/18, 17/58, 17/74*
U.S. Cl. 244—149 **22 Claims**



22. A main parachute apparatus with secondary parachute for aiding initial inflation thereof being particularly useful for large parachutes comprising:

(a) a main canopy means including a plurality of vertically extending main panels, said main canopy means defining a main inlet opening in the lower portion thereof;

(b) a plurality of suspension lines of kevlar material fixedly secured with respect to said main panels of said main canopy means and extending downwardly therefrom;

(c) load carrying means secured to the lower portion of each of said suspension lines to retain a load as desired;

(d) a plurality of main loop means attached with respect to said panels of said main canopy means;

(e) a secondary canopy means positioned within said main inlet opening of said main canopy means, said secondary canopy means including a secondary inlet opening in the lower portion thereof to facilitate inflation of said secondary canopy means and including a main inflation opening in the upper portion thereof adapted to supply air from within said secondary canopy to said main canopy means to facilitate initial inflation thereof;

(f) a plurality of secondary loop means attached peripherally with respect to said secondary canopy means at the approximate vertical midpoint of said secondary panels;

(g) a retaining cord extending through said secondary loop means and said main loop means to be movable with respect thereto and to retain said main canopy means attached with respect to said secondary canopy means during the initial period of inflation of said main canopy means, said retaining cord maintaining said main inlet opening in a generally circular shape to facilitate full inflation thereof, said retaining cord maintaining said main panels and said suspension lines symmetrically distributed about said secondary canopy means;

(h) a retaining cord pyrotechnic cutting means for releasing of said main loop means with respect to said secondary loop means to allow full inflation of said main canopy means during the final period of inflation thereof;

(i) time delay actuation means for controlling activation of said pyrotechnic cutting means;

(j) stay lines extending between said main canopy means and said secondary canopy means to retain said secondary canopy means in position after full inflation of said main canopy means;

(k) supplementary reefing means secured vertically along at least some of said main panels of said main canopy means to retain sections of reefed panels collapsed until actuation of said retaining cord pyrotechnic cutting means, said reefed panel sections being equally and symmetrically spaced about said main canopy means, said main panels defining eyelets extending therethrough, said supplementary reefing means further including lacing means extending through said eyelets and about said retaining cord to facilitate retaining of said main canopy means prior to release of said retaining cord cutting means and to facilitate release of said supplementary reefing means after actuation thereof;

(l) secondary reefing means adapted to retain said main inflation opening of said secondary canopy means closed prior to full inflation of said secondary canopy means; and

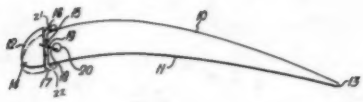
(m) fabric scoop means positioned on the outer surface of said main canopy means to facilitate inflation thereof.

4,955,565

LOW DRAG SURFACE

John F. Coplin, Derby, England, assignor to Rolls-Royce plc., London, England

Filed Sep. 20, 1984, Ser. No. 662,983
Int. Cl.[5] B64C *1/38*
U.S. Cl. 244—199 **9 Claims**



1. A low drag surface having a flow of fluid across it and comprising:

an intermittent linear vortex producing means at its upstream edge extending transverse to the direction of said flow and producing a succession of rolling vortices extending transverse to said flow, said intermittent vortex producing means comprises a portion of said surface movable with respect to the remainder of said surface to produce a discontinuity which produces said vortex, said movable surface having two states, one in which it produces the vortex and the other in which it frees the vortex to move with the flow of fluid.

4,955,566

BAG HOLDING SYSTEM

Donald L. Bolich, 1136 Birdie Rd., Broomfield, Colo. 80020

Filed Oct. 13, 1989, Ser. No. 420,911
Int. Cl.[5] B65B *67/04*
U.S. Cl. 248—101 **16 Claims**

1. A system adapted to support a container and its contents on a support structure above the floor comprising:

a mounting element;

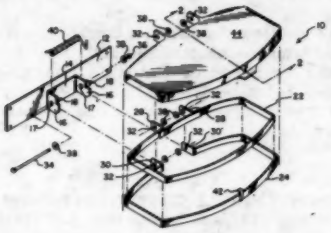
means for holding and receiving a container;

hinge means for pivotally connecting said holding and receiving means to said mounting element;

a hinge pin, said hinge pin being included as a portion of said hinge means, and

a coil spring for biasing said holding and receiving means into a first normal substantially horizontal position, said coil spring being wrapped around said hinge pin, said coil spring having a first end and a second end, said first end of said coil spring being connected to said mounting element, and said second end of said coil spring being connected to said means for holding and receiving a container, said coil spring having a given load bearing capacity, said coil spring being adapted to be overcome when the load of a

holding and receiving means and a container and its contents exceed the given load bearing capacity of said coil spring, to thereby allow said supporting and holding



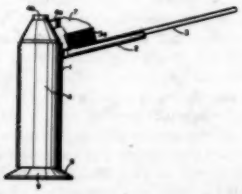
means to pivot downwards from its normal substantially horizontal position so that a container and its load can be supported by the floor or the support structure on which the system is mounted.

4,955,567

TOOTHBRUSH HOLDER FOR UPRIGHT TOOTHPASTE DISPENSER

Frank J. Longhurst, 127 N. Highland Rd., Springfield, Pa. 19064

Filed Jan. 12, 1989, Ser. No. 295,986
Int. Cl.[5] B65D *35/56*
U.S. Cl. 248—108 **9 Claims**



1. An apparatus enabling easier loading of a toothbrush with toothpaste, which comprises:

(a) means for grasping an upright toothpaste dispenser; and

(b) means for holding a toothbrush, wherein said toothbrush holding means are rigidly attached to an edge of said dispenser grasping means and extend radially outward from said dispenser grasping means, so that a toothbrush placed in said toothbrush holding means may receive toothpaste from the nozzle of the upright toothpaste dispenser.

4,955,568

PANHEAD FOR CAMERA

Chadwell O'Connor, and Joel W. Johnson, both of Newport Beach, Calif., assignors to Q-CO Industries, Inc., New York, N.Y.

Filed Oct. 20, 1989, Ser. No. 424,495
Int. Cl.[5] F16M *11/12*
U.S. Cl. 248—183 **20 Claims**

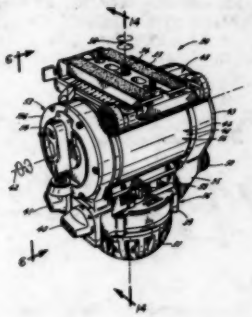
5. A counterbalance mechanism for a panhead comprising, in combination,

a tilt drum mounted for rotation about a substantially horizontal tilt axis,

at least two springs mounted in perpendicular planes to said tilt axis,

first means for mounting one end of each said spring along a common horizontal axis, said common axis lying in a vertical plane containing said tilt axis,

second means for mounting the opposite end of each said spring at an equal angle to said vertical plane on opposite sides of said plane,



means for securing against rotation relative to said tilt axis one end of each said spring having the same type means for mounting,

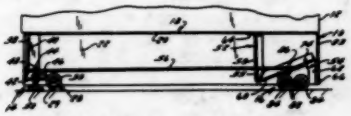
means for coupling the opposite ends of each said spring to said tilt drum for rotation therewith, such that said springs exert a restoring torque on the tilt drum when said tilt axis and said common axis do not coincide.

4,955,569

REFRIGERATOR LEVELING SYSTEM

Philip F. Hottmann, Cross Plains, Wis., assignor to Sub-Zero Freezer Company, Inc., Madison, Wis.

Filed Jul. 18, 1989, Ser. No. 381,531
Int. Cl.[5] F16M *11/00*
U.S. Cl. 248—188.2 **13 Claims**



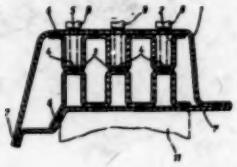
1. A leveling apparatus for a refrigerator, said apparatus comprising:

a pair of leveling assemblies mounted on each side of the bottom of the refrigerator;

each leveling assembly including a housing having a front and back, means in the front of said housing for stabilizing and leveling the front of the refrigerator, means in the back of said housing for leveling the back of the refrigerator wherein said back leveling means comprises a bracket mounted in the back of said housing, said bracket having a ramp sloped upwardly toward the back of said housing and a roller bracket assembly operably positioned to engage said ramp whereby on movement of said bracket assembly toward the front of said housing, the refrigerator will be raised and if moved toward the back of said housing, the refrigerator will be lowered; and

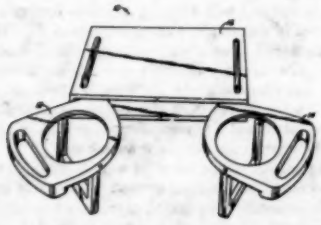
adjusting means in the front of said housing operatively connected to said leveling means in the back of said housing for adjusting the position of said back leveling means with respect to said housing to level the back of the refrigerator.

4,955,570
CLOSED HOLLOW SUPPORT
Erwin Benz, Gechingen; Wolfgang Rau, Renningen; Rainer Bauer, Wildberg, and Gerd Willy, Weil-Newweiler, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany
Filed Jul. 12, 1989, Ser. No. 379,171
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1988, 3823522; May 6, 1989, 3914960
Int. Cl.[5] F16M 3/00
U.S. Cl. 248—300 8 Claims



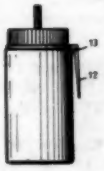
1. A closed hollow support includes two sheet metal support sections that are welded together in the area of their longitudinal edges to define a hollow space between themselves;
two stiffening sections for reinforcing the hollow support are arranged in the hollow space of the hollow support;
these stiffening sections extend along a longitudinal direction of the hollow support and are welded to the hollow support;
each of the two support sections is welded to a respective stiffening section;
the stiffening sections have a meandering shape in cross-section at least in areas thereof;
the stiffening sections are arranged approximately mirror-invertedly with one another in the hollow space and have opposed mutual contact surface means extending in longitudinal direction of the hollow support for connection of these stiffening sections; and
wherein hole means are provided in at least one support section in the area of these contact surfaces for passage of connecting tools for connecting the two stiffening sections together after the respective stiffening sections have each have welded to the support sections and the mutual contact surface means are aligned for connection.

4,955,571
DUAL ACTION CUPHOLDER
Brian S. Lorence, Warren, and Richard A. Phelps, Ferndale, both of Mich., assignors to Chivas Products Limited, Sterling Heights, Mich.
Filed Nov. 21, 1989, Ser. No. 437,252
Int. Cl.[5] A47K 1/09
U.S. Cl. 248—311.2 16 Claims



1. A container holder comprising:
a housing having a top surface and a bottom surface and a front and a back; and
a first shelf having holder means for supporting a container disposed therein, the holder means having a central axis, the shelf further having means for movably mounting the shelf within the housing, the means for movably mounting comprising
sliding mount means for permitting the shelf to move axially from a first position substantially at the back of the housing to a second position substantially at the front of the housing, and pivoting mount means for permitting the shelf to rotate about an axis other than the holder means central axis.

4,955,572
SPORTS BOTTLE SUPPORTING DEVICE
Norman Simmons, 10 Notch Ct., Dix Hills, N.Y. 11746
Filed Jun. 15, 1989, Ser. No. 366,440
Int. Cl.[5] A47F 1/00
U.S. Cl. 248—312 5 Claims

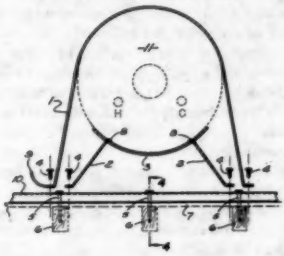


1. An improved sports bottle comprising an integrally formed plastic liquid container, said container having a base end surface, a neck end surface and a cylindrical side surface, said cylindrical side surface situated between said neck end surface and said base end surface, said container having an inside and an outside, said cylindrical side surface having an outside diameter, said container having an integrally formed threaded neck, said threaded neck having a first attached end and a second fill end, said threaded neck having a maximum external diameter smaller than said outside diameter, said neck end surface situated between said cylindrical side surface and said first attached end of said neck, said neck end surface essentially parallel to said base end surface of said container, said fill end of said neck communicating with said inside of said bottle through said neck, said sports bottle including a threaded cap fitting said neck, wherein the improvement comprises:
(a) a supporting member having a hole, said supporting member mounted on said neck through said hole, said supporting member secured against vertical movement by said cap, said supporting member having an elongated mounting tab, said mounting tab having a fixed end integral with said supporting member at said neck end surface on the outside of said container, said elongated mounting tab also having a free end, said elongated mounting tab extending essentially parallel to and on said outside of said cylindrical side surface of said container in a direction from said neck end surface of said container to said base end surface of said container, said free end not extending beyond said base end surface of said container.

4,955,573
WATER HEATER SAFETY FASTENER
George Horvath, 17608 Los Alimos, Granada Hills, Calif. 91344
Filed Dec. 18, 1989, Ser. No. 452,049
Int. Cl.[5] A47K 1/08
U.S. Cl. 248—313 15 Claims

1. A support system for a holding tank positioned near a wall comprising a rigid support collar, rigid support legs removably

attached to said support collar at one end; each said support leg adapted to be attached at an angle to the wall at the other end,



a flexible binding strap adapted to fit around said tank and further adapted to be attached to said wall.

4,955,574

PIPE CLIP

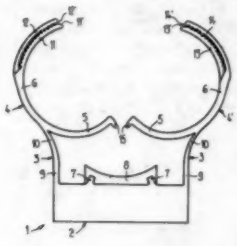
Fred Freier, Baretswil, Switzerland, assignor to Egli, Fischer & Co. AG, Zurich, Switzerland

Filed Jul. 17, 1989, Ser. No. 379,796

Claims priority, application Switzerland, Jul. 18, 1988, 02739/88

Int. Cl.[5] F16L *3/08*

U.S. Cl. 248—316.5 **8 Claims**



1. A pipe clip comprising a base plate, a pair of opposed arcuate-shaped strap segments, a pair of relatively flexible connecting-struts connected between the base plate and the outer side of each strap segment at a point intermediate their ends to divide the strap segment into a lower end portion and an upper end portion, said connecting struts being rigidly connected to the baseplate and being rigidly connected to the strap segments and mutually engageable closure means on the upper end portions of the strap segments to lock the straps in place around a pipe, said struts maintaining the straps segments in disengaged position with their lower end portions adjacent each other and their upper end portions apart to permit the insertion of a pipe into the clip, whereby the force of inserting a pipe into the clip against the lower end portions of the strap segments bends the connecting struts inwardly and brings the upper end portions of the straps together and the closure means into engagement.

4,955,575

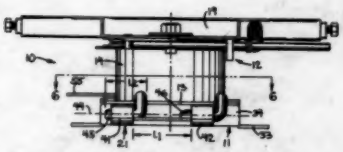
TILTING/REMOVABLE SEAT MOUNTING ASSEMBLY

Daniel S. Moore, Elkhart, Ind., assignor to Bous Manufacturing & Distributing Inc., Elkhart, Ind.

Filed Jun. 2, 1989, Ser. No. 360,400

Int. Cl.[5] A47D *19/04*

U.S. Cl. 248—398 **15 Claims**



1. A pedestal-type mounting assembly for a vehicle seat to permit the seat to be both tilted relative to the vehicle floor and easily removed from the vehicle without use of tools, said mounting assembly comprising:

a base plate structure having front and rear edges and being adapted for fixed attachment to a vehicle floor;

a pedestal assembly positioned on and projecting upwardly from said base plate structure, said pedestal assembly having means associated with an upper end thereof for attachment to a vehicle seat, and said pedestal assembly having a support structure adjacent the lower end thereof adapted for supportive bearing engagement with said base plate structure;

releasable hinge means operably connected between said support structure and said base plate structure adjacent one of said edges for defining a generally horizontally and sidewardly extending hinge axis;

manually-releasable lock means cooperating between said support structure and said base plate structure adjacent the other edge thereof for fixedly but releasably connecting said pedestal assembly and said base plate structure together;

said manually-releasable lock means including a lock portion stationarily secured relative to said base plate structure and a lock member movably supported on said support structure for releasable engagement with said lock portion when the support structure is supportably engaged with said base plate structure, said lock means also including a manually-engageable handle connected to said lock member for effecting movement thereof, said handle being readily accessible and supported for swinging movement relative to the pedestal assembly between locked and unlocked positions;

said hinge means including a hinge tube fixed to one of said support and base plate structures and defining therein a generally horizontally and sidewardly extending cylindrical opening whose axis defines said hinge axis, and said hinge means including a generally horizontally elongated and sidewardly extending hinge pin fixed to the other of said support and base plate structures, said hinge pin being of a horizontally and sidewardly projected cantilevered structure having a free end so as to be slidably insertable into or out of the opening in said hinge tube, said hinge pin adjacent the other end thereof being permanently fixedly secured relative to the other of said support and base plate structures;

whereby said pedestal assembly and a seat attached thereto can be tilted about the hinge axis when the lock means is released, and whereby the pedestal assembly and attached vehicle seat can be totally disconnected from the floor plate structure when in the tilted position merely by horizontally sidewardly displacing the pedestal assembly relative to the floor plate structure to slidably withdraw the cantilevered hinge pin from the hinge tube.

4,955,576

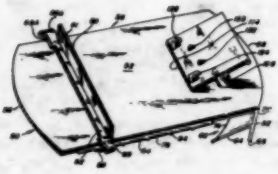
VERSATILE WRITING BOARD

Michael K. Moberg, 584 S. 1st St., Carrington, N. Dak. 58421

Continuation of Ser. No. 375,184, Jun. 30, 1989, abandoned, which is a continuation-in-part of Ser. No. 216,366, Jul. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 483,774, Apr. 11, 1983, abandoned. This application May 1, 1990, Ser. No. 517,498

Int. Cl.[5] A47B *19/00*

U.S. Cl. 248—449 **46 Claims**



1. A portable writing board mountable for use on a steering wheel of a vehicle and also entirely stable for writing use when rested upon any flat surface, comprising a platform member having substantially parallel side edges, a lower edge, and a curved upper edge approximating the curvature of the outer diameter of a vehicle steering wheel, and a single continuous retaining collar depending from said curved upper edge and unified thereto, there being no other structure extending downwardly from said platform, the distance between said parallel side edges being less than the distance between said lower edge and said curved upper edge, said retaining collar consisting essentially of a depending skirt portion and a flange-like portion directed radially inwardly from the bottom edge of said skirt portion to thereby form a recess capable of accommodating the rim of a vehicle steering wheel, said depending retaining collar being further characterized by the fact that its most depending portions form a bottom surface which extends continuously along the entire curvature of said retaining collar, which bottom surface lies in an imaginary plane intersecting said platform at an axis line perpendicular to said side edges of said platform and located at the lowermost bottom edge of said platform, whereby said bottom surface of said retaining collar provides continuous contact for underlying stable support of the entire curved upper edge of said writing board when the same is used on a flat surface.

4,955,577

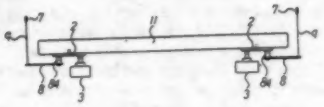
REMOVABLE MOUNTING ASSEMBLY FOR FOG LIGHTS AND FLAG POLES

Daw-Long Ching, No. 4-1, Lane 68, Chen Kung Road, Tainan City, Taiwan

Filed Jun. 9, 1989, Ser. No. 363,739

Int. Cl.[5] H01Q *1/12*

U.S. Cl. 248—539 **2 Claims**



1. A detachable mounting assembly adapted for the location of a fog light and a flag pole having a light element disposed at the top end thereof, under the front bumper of an automobile, comprising:

a mounting device screwed under the bumper by means of a screw-like protrusion disposed on the top surface thereof;

a pair of base elements each of which is provided with a threaded end so as to permit the same to be secured under said mounting device, the other end thereof being defined in an octagon shape with a hole disposed at the center thereof and a peripheral engagement groove being provided about the central exterior portion thereof;

a fog light having a first C-shaped mounting member fixed under the bottom thereof, which is provided with a pair of lugs; on each of the lug being disposed a central hole with a number of pores located adjacent to it;

a second C-shaped mounting member provided with a horizontal board and a pair of depending lugs having a central through hole disposed on the horizontal board thereof and the lugs thereof being provided with holes in correspondence with the central holes disposed on the lugs of said first mounting member so that the second mounting member can be pivotally engaged with said first mounting member by bolts and screws;

a double ended bolt with one threaded end thereof going through the central hole of said second mounting member and locked in place by a nut means;

a securing assembly including an elongate nut member the interior of the bottom end of which is defined in an octagon form and the top end thereof provided with internal threads, into which a washer, a fixing element, a ring member and a first spring are placed; and the other threaded end of said double ended bolt being engaged with the top threaded end of said elongate nut member in assembly; the lower end of said elongate nut member being provided with 4 symmetric bores in each of which a steel ball is movably disposed, and a second spring being disposed in encircling relation with the lower end of said nut member; and

a tubular cover being slidably attached to the lower end of said elongate nut member with said second spring disposed between the cover and said nut member; a C-shaped clip member being employed to support said tubular cover in place;

whereby the actuation of said tubular cover in one direction will permit said steel balls to move radially outward so as to enable said octagon-shaped end of said base element inserted into the correspondingly-shaped bottom end of said elongate nut member which is associated with a fog light, and the movement of said tubular cover in the opposite direction will force said steel balls to slide in a reverse direction and to engage with the peripheral engagement groove of said base element so that a fog light can be removably secured to said mounting device attached to the underside of the bumper of an automobile.

4,955,578

RESILIENTLY FASTENED SUPPORT DEVICE FOR A MICROPHONE

Werner Fidi, Baden, Austria, assignor to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H., Vienna, Austria

Filed Apr. 13, 1989, Ser. No. 337,737

Claims priority, application Austria, Apr. 13, 1988, 957/88

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—559 **10 Claims**

1. In a resiliently fastened support device for supporting an arrangement carrying a microphone, wherein the support device is connected to an end of the arrangement which faces away from the microphone and the microphone is mounted on

the other end of the arrangement, wherein the improvement comprises that the support device has a mass which is a multi-

ple of the mass of the microphone and the arrangement carrying the microphone.

4,955,579

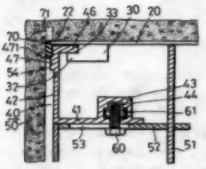
CONCRETE FORMING DEVICE WITH CORNER FORMING ACCESSORY

Yuan-Ho Lee, 851, Chong-San Rd., Nan-Pao Tsun, Kuei-Jen Hsian, Tainan Hsieng, Taiwan

Filed Jun. 23, 1989, Ser. No. 370,753

Int. Cl.[5] E04G *11/38, 17/16*

U.S. Cl. 249—19 **6 Claims**



1. The forming device for forming a poured ceiling by which a neat corner is formed between the ceiling and an adjacent wall, said forming device comprising:

a form panel having a portion which has an edge adjacent to the wall, a forming face and a back face;

a plurality of engaging projections formed on said back face and having a flange extending from said projections in a direction substantially parallel to said back face, said flange confining a groove with said back face which opens towards the wall;

a filler member to be placed between the wall and said edge of said form panel;

a form holding means having a portion substantially parallel to said form panel, and adjacent to, but not engaged with the wall;

a filler holding means having a first portion substantially parallel to said form panel and a second portion substantially perpendicular to said first portion, said first portion being slidably secured to said portion of said form holding means, said second portion extending upward adjacent to the wall, and having a depressing portion to depress said filler member against the wall and a mortise portion to engage with said groove of said form panel, said depressing portion and said mortise portion forming an angle therebetween, said mortise portion having an outer face opposing said back face of the said form panel, said outer face being slanted upward from said depressing portion to an end of said mortise portion forming an obtuse angle with said depressing portion; and

means for positioning said first portion of said filler holding means relative to said parallel portion of said form holding means when said filler holding means is in a proper position.

4,955,580

CONTACT LENS MOLD

William E. Seden, Fareham; David W. J. Shepherd, Eastleigh, and Peter Henderson, Southampton, all of England, assignors to CooperVision Optics Limited, Southampton, England

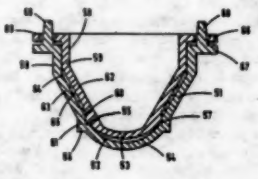
PCT No. PCT/GB87/00045, § 371 Date Nov. 4, 1987, § 102(e) Date Nov. 4, 1987, PCT Pub. No. WO87/04390, PCT Pub. Date Jul. 30, 1987

PCT Filed Jan. 27, 1987, Ser. No. 107,593

Claims priority, application United Kingdom, Jan. 28, 1986, 8601967

Int. Cl.[5] B29D *11/00*

U.S. Cl. 249—82 **9 Claims**



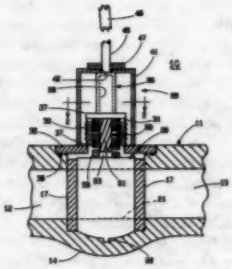
1. A polyolefin mould for casting contact lenses from a polymerisable monomer composition which shrinks on polymerisation, said mould comprising (a) male and female mould halves each of which has a diaphragm portion which is shaped to provide a surface corresponding to a lenticular surface, said mould halves, when closed together, cooperating to define a mould cavity for receiving a volume of said monomer composition, (b) each of said mould halves having a non-flexible shoulder portion surrounding said cavity and shaped so that on closing the mould under a closing pressure said shoulder portions engage in an essentially line contact to form a liquid-tight seal of the cavity and to define an edge moulding portion of said cavity; and (c) the diaphragm portion of the male mould being more flexible than the female, whereby in use, the male diaphragm portion is deflected into said cavity under the forces generated in said mould by said monomer composition when polymerised in said closed cavity.

4,955,581

BELLOWS SEALED PLUG VALVE

Stephen J. Dukas, Jr., Idaho Falls, Id., assignor to United States Department of Energy, Washington, D.C.

Filed Sep. 29, 1989, Ser. No. 414,359
Int. Cl.[5] F16K *41/10, 31/50, 31/54*
U.S. Cl. 251—214 **10 Claims**



1. An improved ¼ turn operator valve including a valve body having an inlet passage and an outlet passage, a valve chamber between said inlet and outlet passages, a valve plug having substantially the same shape as said valve chamber and being rotatably disposed therein, said valve plug having a flow passage disposed therethrough, said flow passage disposed such that with said valve plug in a first position said flow passage is in alignment with said inlet and said outlet passages and provides fluid communication therebetween, and with said valve plug in a second position said flow passage is out of alignment with said inlet and outlet passages and said valve plug interrupts fluid communication therebetween, a shaft connected to a valve actuator movable linearly in response to a signal from said valve actuator, wherein the improvement comprises:

a cap assembly, an actuator shaft passing through said cap assembly, a secondary sealing member encircling said actuator shaft, a collar assembly in contact with said actuator shaft and responsive to linear motion of said actuator shaft, an operator shaft adapted to receive a torsional force from said collar assembly, a bellows cooperating with said collar assembly and said cap assembly to form a primary sealing assembly isolating said valve chamber from said actuator shaft to prevent fluids from passing between said collar assembly and said bellows, a valve plug connected to said operator shaft and a return position spring encircling said operator shaft;

said collar assembly includes a cylindrical member encircling said operator shaft and a flange member attached to said cylindrical member and said bellows, and wherein said torsional force is provided by helical threads on said cylindrical member and said operator shaft causing rotation of said valve plug upon linear reciprocal movement of said actuator shaft; and

wherein said cap assembly includes sealing flange, and sealing means thereby effecting a fluid tight seal between said valve body and said sealing flange.

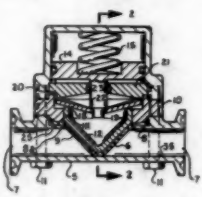
4,955,582

WEIRLESS DIAPHRAGM VALVE

Hans D. Baumann, 32 Pine St., Rye, N.H. 03870

Filed Aug. 14, 1989, Ser. No. 393,393
Int. Cl.[5] F16K *7/17*
U.S. Cl. 251—58 **3 Claims**

1. Diaphragm valve comprised of a housing having inlet and outlet ports and a conical chamber having a cone angle of less than 120 degrees straddling said ports and terminating in an upper flanged surface, spacer means suitably attached to the upper portion of said housing and having a lower flanged surface cooperating with and retraining and compressing between said upper flanged surface of the housing the outer rim of a non-convoluted elastomeric diaphragm capable of stretching and assuming the shape of said conical chamber during valve closure, and wherein said diaphragm in its undeformed



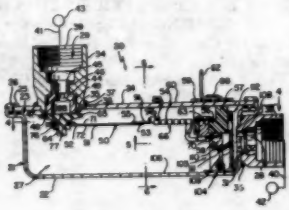
stage is essentially flat in shape, said spacer means having a central opening slidingly engaging a conical element capable of moving said diaphragm towards engagement with the walls of said conical chamber thereby blocking fluid flow between said ports, and wherein said conical element is motivated by a suitable actuating device having a stem.

4,955,583

VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME

Harvey J. Shopsky, Latrobe, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 192,838, May 11, 1988, Pat. No. 4,856,164, which is a division of Ser. No. 47,205, May 6, 1987, Pat. No. 4,769,887, which is a division of Ser. No. 870,363, Jun. 4, 1986, Pat. No. 4,685,652, which is a division of Ser. No. 794,742, Nov. 4, 1985, Pat. No. 4,651,968. This application Jun. 15, 1989, Ser. No. 366,522
The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.
Int. Cl.[5] F16K *31/70*
U.S. Cl. 251—11 **4 Claims**



1. In a valve construction comprising a housing means provided with a chamber therein and with an inlet leading to said chamber and an outlet leading from said chamber, a valve seat carried by said housing means and leading to said outlet, a movable bimetallic lever means carried by said housing means and having an operating bimetallic part, a heater wire means disposed in coiled relation about said operating part to heat the same when an electrical current flows through said heater wire means, and a valve member carried by said bimetallic lever means for opening and closing said valve seat under the control of said operating part of said bimetallic lever means, said operating part of said bimetallic lever means having a fastening means operatively interconnected to said heater wire means to tend to hold said heater wire means in said coiled relation on said operating part of said bimetallic lever means, the improve-

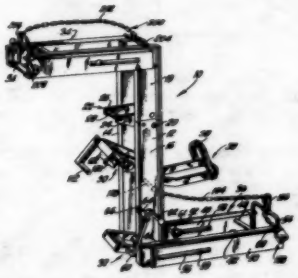
ment wherein said heater wire means comprises a length of said wire means doubled upon itself to define a looped end and a pair of free ends adjacent each other with said looped end being said part of said heater wire means that is operatively interconnected to said fastening means of said bimetallic lever means.

4,955,584

PUMP JACK

Carl Anderson, c/o Alum-A-Pole Corporation 2589 Richmond Terrace Industrial Bldgs, 9A&B, Staten Island, N.Y. 10303-0002

Filed Mar. 21, 1989, Ser. No. 326,326
Int. Cl.[5] A63B *27/00*
U.S. Cl. 182—133 **29 Claims**



1. A pump jack arranged for traveling up and down a pole, comprising:

a frame member having a support arm;

a lower shackle member and an upper shackle member supported by said frame member;

a pump arm pivotally connected to said frame member for causing, in conjunction with the support arm, said lower and upper shackle members to alternately grip the pole with the non-gripping shackle member being stepped upwardly along the pole;

said upper shackle member and said lower shackle member each including a forward and a rearward gripping member for engaging a front and a rear surface, respectively, of the pole during alternating gripping the pole;

said upper shackle member further including spacing means mounted on said upper shackle so as to be brought into and out of contact with the front surface of the pole and to thereby enable spacing of the forward gripping member of the upper shackle member from the front surface of the pole when said upper shackle member is non-gripping, to thereby facilitate upward stepping of the upper shackle member.

4,955,585

HYDRAULICALLY DRIVEN FAN SYSTEM FOR WATER COOLING TOWER

John A. Dickerson, 15660 W. Hardy, Ste. 130, Houston, Tex. 77060

Filed Jun. 22, 1989, Ser. No. 369,814
Int. Cl.[5] B01F *3/04*
U.S. Cl. 261—26 **21 Claims**

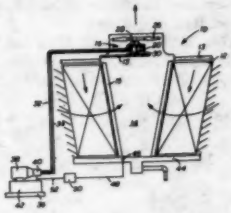
1. A hydraulically energized fan system for water cooling towers and the like, comprising:

(a) a rotary fan being positioned at the upper portion of a water cooling tower;

(b) a hydraulic motor being positioned adjacent said rotary fan and having a driving connection with said rotary fan;

(c) a hydraulic pump mechanism being located at a position remote from said rotary fan;

(d) hydraulic supply and return lines interconnecting said hydraulic pump and said hydraulic motor and forming a closed-loop hydraulic system incorporating said hydraulic pump and hydraulic motor; and



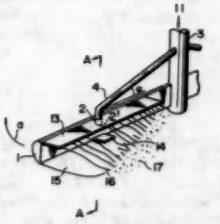
(e) means for reversing the flow of hydraulic fluid in said hydraulic supply and return lines to thus induce reversal of said hydraulic motor for rendering said rotary fan reversible.

4,955,586

APPARATUS FOR TREATING SLURRY BY GAS-LIQUID CONTACT METHOD

Masakazu Onizuka, and Atsushi Tatani, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,430
Claims priority, application Japan, Apr. 8, 1988, 63-85324
Int. Cl.[5] B01F *3/04*
U.S. Cl. 261—87 **2 Claims**



1. An apparatus for treating a slurry by gas-liquid contact, said apparatus comprising a hollow rotary shaft, stirring rods fixed to the lower end of said shaft, and gas supply pipes to supply a gas to the negative-pressure region which is formed behind the stirring rods as they rotate, said gas supply pipes having their openings fixed to the back of said stirring rods, and at least one of said stirring rods being provided on the top thereof with a plate to stabilize the negative-pressure region, said plate extending in the direction opposite to the rotating direction of the stirring rod.

4,955,587

ARRANGEMENT FOR RECOVERING MOLTEN PIG IRON OR STEEL PRE-PRODUCTS FROM LUMPY IRON-OXIDE CONTAINING CHARGING SUBSTANCES

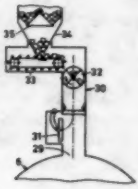
Horst Sulzbacher, Leoben, Austria, and Markus Hubig, Aachen, Fed. Rep. of Germany, assignors to Korf Engineering GmbH, Duesseldorf, Fed. Rep. of Germany

Division of Ser. No. 221,876, Jul. 20, 1988, Pat. No. 4,895,593. This application Aug. 28, 1989, Ser. No. 399,072

Claims priority, application Austria, Jul. 30, 1989, A1933/87

Int. Cl.[5] F27B *15/08*

U.S. Cl. 266—156 **7 Claims**



1. An arrangement to be used for carrying out a process of recovering molten pig iron or steel pre-products from scrap containing organic impurities and/or at least one non-ferrous metallic element and having an apparent weight amounting to between 300 and 1,000 kg/m^3 and from lumpy iron-oxide containing charging substances by reducing said charging substances as to obtain a reduction product composed of sponge iron, smelting said sponge iron under supply of carbon carriers and oxygen-containing gas forming a coal fluidized bed, carbonizing and smelting said scrap in said coal fluidized bed and pyrolyzing organic impurities present in said scrap, and producing a CO and H_2 containing reduction gas and top gas, which arrangement comprises

a direct reduction shaft furnace including a charging substance supply duct means for lumpy iron ore, a supply duct means for reduction gas, a discharge duct means for said reduction product formed in said direct reduction shaft furnace, and a top gas discharge duct means,

a meltdown gasifier in communication with said discharge duct means of said direct reduction shaft furnace and adapted to receive said reduction product from said direct reduction shaft furnace, said meltdown gasifier including supply duct means for oxygen-containing gases and carbon carriers, a discharge duct means for discharging said reduction gas formed therein and supplying said reduction gas to said supply duct means of said direct reduction shaft furnace, and tap means for pig iron and slag, wherein said meltdown gasifier is adapted to form said coal fluidized bed therein, and

a scrap charging means.

4,955,588

BEARING FOR THE ELASTIC MOUNTING OF MACHINES, MACHINE PARTS AND/OR VEHICLE PARTS

Horst Reuter, Oberbachem; Jörn-Rainer Quast, Bad Bodendorf, and Roland Schall, Villip, all of Fed. Rep. of Germany, assignors to Boge AG, Eitorf, Fed. Rep. of Germany

Filed May 9, 1989, Ser. No. 349,005

Claims priority, application Fed. Rep. of Germany, May 9, 1988, 3815817

Int. Cl.[5] F16F *5/00*

U.S. Cl. 267—140.1 **9 Claims**

1. An elastic bearing for damping vibrations, said elastic bearing being for use in a deleterious ambient environment, said elastic bearing comprising:

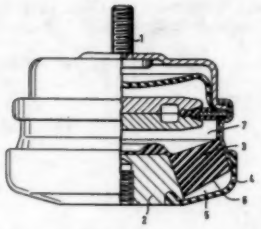
a first attachment member;

a second attachment member;

an elastomeric member interposed between said first attachment member and said second attachment member;

cover member means for sealing at least a portion of said elastomeric member from the deleterious ambient environment;

said cover member means and said elastomeric element forming a chamber therebetween; and



a protective fluid disposed in said chamber, said protective fluid comprising at least one of an inert gas and an inert liquid;

said protective fluid being substantially noneffective in contributing to the damping characteristics of said elastic bearing.

4,955,589

HYDRAULICALLY DAMPED MOUNTING DEVICE

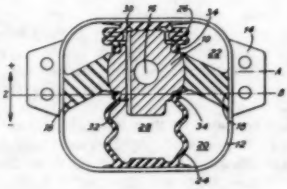
John P. West, Devizes, United Kingdom, assignor to Avon Industrial Polymers Limited, Melksham, United Kingdom

Continuation of Ser. No. 288,675, Dec. 22, 1988, abandoned. This application Feb. 23, 1990, Ser. No. 492,232

Claims priority, application United Kingdom, Dec. 23, 1987, 8730005

Int. Cl.[5] F16F *5/00*

U.S. Cl. 267—140.1 **11 Claims**



1. A hydraulically damped mounting device, comprising:

a first anchor part;

a second anchor part;

a first bellows wall interconnecting said first and second anchor parts;

a first chamber for hydraulic fluid at least partially defined by said first bellows wall;

a second bellows wall connected to said first anchor part;

a second chamber for hydraulic fluid at least partially defined by said second bellows wall;

a passageway interconnecting said first chamber and said second chamber; and

a resilient wall interconnecting said first and second anchor parts, said resilient wall being independent of said first and second bellows wall;

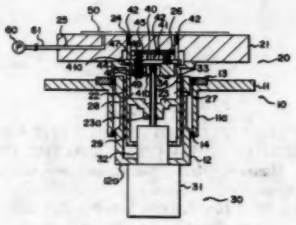
whereby the volumes of the first and second chambers are changeable due to movement of the corresponding bellows wall with substantially no spring resistance applied to said hydraulic fluid by said bellows wall.

4,955,590

PLATE-LIKE MEMBER RECEIVING APPARATUS

Masaki Narushima, and Itaru Takao, both of Yamanashi, Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,224
Int. Cl.[5] B25B *11/00*
U.S. Cl. 269—21 5 Claims



1. A plate-like member receiving apparatus for receiving a plate-like member comprising:

a base unit;

a table member having a supporting surface on which said plate-like member is supported and which is vertically movable with respect to said base unit;

a receiving member having at least three receiving pins which project from said supporting surface and are concealed under said supporting surface upon vertical movement of said table member, movement of said receiving member relative to said base unit being eliminated when said plate-like member is supported on said table member; and

drive means for vertically moving said table member,

wherein said plate-like member is transferred onto said receiving pins while said receiving pins project, and is supported on said supporting surface of said table member while said pins are concealed.

4,955,591

SINGLE PIECE WEDGE CLAMP

William Talley, Rte. 5, Box 567, Breaux Bridge, La. 70517

Filed Sep. 18, 1989, Ser. No. 408,999
Int. Cl.[5] B25B *5/08*
U.S. Cl. 269—217 9 Claims

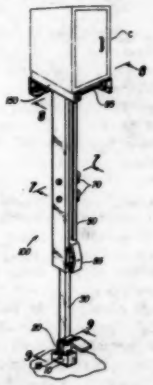
1. A clamping device for clamping work pieces to a work support or adjacent work pieces comprising a first fixed jaw and an opposing fixed jaw, integrally formed handled means for connecting said first fixed jaw to said opposing fixed jaw, said handle means extending outwardly with respect to an axis taken between said first fixed and said opposing fixed jaws, said opposing fixed jaw having an outermost end and inner arcuately shaped clamping surface portion, said clamping surface portion of said opposing fixed jaw being defined by a continuous series of points extending from adjacent said outermost end toward said handle which points are continuously and progressively in closer proximity to said first fixed jaw so that the straight line distance between said first fixed jaw and said clamping surface portion of said opposing fixed jaw is continuously decreased as said handle is pivoted about said first fixed jaw and toward a work piece being clamped between said first and said opposing fixed jaws, whereby, when said first fixed jaw is in contact with a first side of the work piece and said opposing fixed jaw is rotated relative to the opposite side of the work piece, said clamping surface portion of said opposing fixed jaw will be progressively brought closer to said first fixed jaw to thereby clamp the work piece therebetween.

4,955,592

LIFTING AND POSITIONING DEVICE FOR CABINETS AND CONSTRUCTION PANELS

Richard Brennan, Sr., North Babylon, N.Y., assignor to Kim-Rick, Inc., Bayonne, N.J.

Filed Aug. 1, 1988, Ser. No. 226,851
Int. Cl.[5] E04G *21/14*
U.S. Cl. 269—68 17 Claims



1. A panel support apparatus comprising:

a longitudinal member having a workpiece holding end and an opposite end;

means, between said workpiece holding end and said opposite end, for adjusting the length of said longitudinal member;

means for locking the longitudinal member to a predetermined length;

said locking means further comprising:

a first cylindrical body having one end and an opposite end, said cylindrical body further having portions defining a first inner diameter adjacent to said one end, a second inner diameter extending from said opposite end, a shoulder portion between said first and second inner diameters and a flanged portion adjacent to said opposite end;

a second cylindrical body adjacent to said first cylindrical body, said second cylindrical body having a first end, an opposite second end and portions defining a first threaded bore adjacent said first end;

cam means rotatably mounted on said second cylindrical body;

a fastener member threadably engaging said first threaded bore in said second cylindrical body and engaging said shoulder portion in said first cylindrical body to join said first and second bodies;

whereby said flanged portion and said cam means frictionally engage in said longitudinal member when said cam means is rotated; and

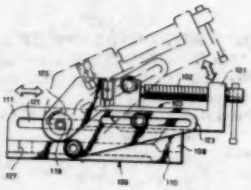
means for folding said longitudinal member so that said workpiece holding end moves toward said opposite end.

4,955,593

POSITION AND ANGLE OF POLAR COORDINATE ADJUSTABLE VICE

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Sep. 27, 1989, Ser. No. 413,297
Int. Cl.[5] B23Q *1/04*
U.S. Cl. 269—71 **4 Claims**



1. An adjustable angle vise for clamping a workpiece, in combination, comprised of:

a base frame having a pair of substantially parallel longitudinal trackways formed therein;

an upper frame supported by the base frame, the upper frame including at least one pair of clamping faces, at least one of said clamping faces being movable toward the other for the selective clamping and unclamping of workpieces therebetween;

a pair of sliding pivots being rotatably carried by the upper frame, such that the upper frame pivots about the sliding pivots for pivotal movement of the upper frame and the clamping faces carried thereby in a pivotal direction, each of the sliding pivots further being slidingly received in respective trackways of the base frame, such that the upper frame is supported by the base frame, and further such that the upper frame and the clamping faces carried thereby are horizontally slidably movable for sliding movement of the upper frame and the clamping faces carried thereby in a first horizontal direction;

a pair of lateral struts having respective first ends, the first ends of the struts being pivotally secured to the base frame at respective pivot points for pivotal movement of the struts about the pivot points relative to the base in the second plane in response to the pivotal movement of the upper frame including the clamping faces carried thereby, each of said lateral struts having a respective trackway formed therein;

a pair of slides, each slide received through one of the respective trackways formed in the lateral struts and fixed to the upper frame, such that the slides freely slide in the trackways of the struts when the upper frame is pivoted, and further such that the slides aid in fixing and securing the upper frame in the pivoted position selected;

the base frame further having a third longitudinal trackway formed therein;

a foot plate for being received on and secured to the support;

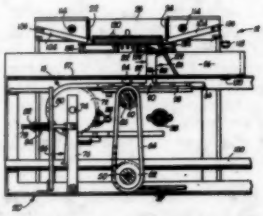
an upstanding rod having a vertical axis, said rod including a lower end and an opposite upper end having a rotatable lug carried thereon, the rod positioned with the lug being received in the third longitudinal trackway, so that the base frame and the upper frame are carried thereby, and further so that the base frame and the upper frame are horizontally slidably movable for further sliding movement of the upper frame and the clamping faces carried thereby in a second horizontal direction, the lower end of the rod being rotatably carried by the foot plate for rotational movement of the rod about the vertical axis, so that the base frame and the upper frame carried thereby are rotatably carried by the rod for rotational movement of the upper frame including the first and second clamping faces carried thereby in a rotational direction.

4,955,594

DROP FEED METERING HOPPER FOR MULTIPLE SECTION NEWSPAPERS AND THE LIKE

Charles N. Hannon, Olathe, Kans., assignor to Stepper, Inc., Olathe, Kans.

Filed Jun. 7, 1988, Ser. No. 203,332
Int. Cl.[5] B65H *39/02*
U.S. Cl. 270—58 **24 Claims**



1. Newspaper section handling apparatus comprising:

means defining an upright hopper for receiving at least one newspaper section in generally flat and substantially horizontal orientation,

said hopper presenting a lower discharge outlet located in the bottom thereof,

said at least one newspaper section presenting a lowermost face;

means defining a conveyor for moving newspaper sections along a path of travel including a portion extending beneath said hopper;

means defining a gate for said discharge outlet;

means for shifting said gate means between a closed position closing said outlet and an open position opening said outlet,

said gate means including means engageable with said lowermost face of said at least one newspaper section for supporting the latter in said hopper when said gate means is in said closed position,

said gate means when in said open position enabling newspaper sections received in said hopper to drop through said outlet and onto said conveyor;

means for selectively actuating said shifting means in order to shift said gate means toward said open position in timed relationship to the movement of said conveyor means,

said means engageable with said lowermost face including a smooth upwardly facing surface slidably engageable with said lowermost face of said newspaper section during said shifting movement of said gate means; and

a wiper element in sliding contact with said upwardly facing surface of said gate means during movement between said closed position and said open position for facilitating sliding motion of said upper surface relative to any newspaper sections supported thereon.

4,955,595

DOCUMENT FEEDING APPARATUS

Minoru Kawano; Kazunobu Miura; Kazushige Murata, and Mitsuru Nagoshi, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Sep. 1, 1989, Ser. No. 401,788

Claims priority, application Japan, Sep. 7, 1988, 63-224009; Sep. 7, 1988, 63-117769

Int. Cl.[5] B65H *3/44*

U.S. Cl. 271—9 2 Claims

1. In a document feeding apparatus having a document feed unit adapted to feed documents, which are placed on a document feed tray, sheet by sheet toward a document glass plate in an exposure unit, the improvement characterized in that an auxiliary document feed tray is turnably provided on a portion of the document setting surface of the document feed tray, the auxiliary document feed tray being housed in the document feed tray when stacked documents are to be fed automatically, and the auxiliary document feed tray being turned so as to project over the document feed tray when the documents are fed sheet by sheet by hand.

4,955,596

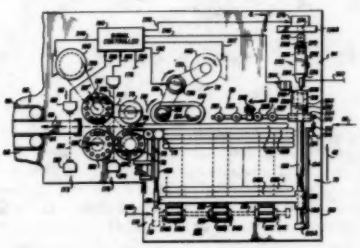
METHOD AND APPARATUS FOR FEEDING AND STACKING ARTICLES

Mario Ricciardi, Glenview, Ill., assignor to Bell & Howell Phillipsburg Company, Allentown, Pa.

Filed Jan. 18, 1989, Ser. No. 298,542

Int. Cl.[5] B65H *7/08*

U.S. Cl. 271—110 27 Claims



1. Apparatus for feeding a plurality of flat articles on edge, said apparatus comprising:

an input magazine wherein a plurality of flat articles are storable on edge in stacked configuration;

singulation means for defining a gap through which a flat article must pass as said flat article is fed from said input magazine;

feeding means for directing a leading flat article in said input magazine in a first direction toward said singulation means, said feeding means comprising means to contact a first flat side of said leading flat article and to impart to said flat article momentum toward said singulation means;

transport means for transporting said plurality of on-edge flat articles in said input magazine in a second direction toward said feeding means, said second direction being essentially perpendicular to said first direction;

feed assist means mounted on said input magazine for applying pressure against said first flat side of said leading flat article in said input magazine, said feed assist means being displaceable along said second direction;

feed interval detection means for detecting when an amount of time elasped since a last flat article fed from said input magazine cleared said singulation means exceeds a predetermined time interval and for producing a signal indicative thereof; and,

displacement control means responsive to said signal of said detecting means for controlling the displacement of said feed assist means.

4,955,597

COPYING APPARATUS HAVING A DEVICE FOR HOLDING SHEETS

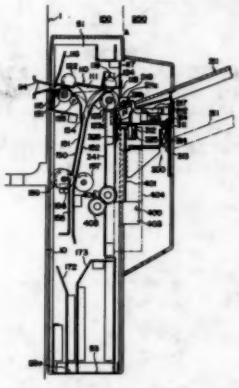
Akiyoshi Johdai; Keichi Kinoshita; Toshio Matsui, all of Toyokawa, and Hirokazu Yamada, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 49,350, May 13, 1987, abandoned. This application Jun. 21, 1988, Ser. No. 211,124

Claims priority, application Japan, May 15, 1986, 61-112316; May 15, 1986, 61-73734[U]; May 15, 1986, 61-73732[U]; May 15, 1986, 61-73733[U]; Jun. 14, 1986, 61-138797

Int. Cl.[5] B65H *29/20*

U.S. Cl. 271—215 3 Claims



1. A copying apparatus including image forming means for forming an image on a sheet, and sheet holding means for holding therein sheets each having an image formed thereon, said sheet holding means comprising:

an inclined sheet holding plate,

a sheet regulating member for regulating respective rear ends of sheets loaded on the sheet holding plate,

means for lowering the sheet holding plate parallel with said regulating member in the vertical direction according to the volume of sheets loaded thereon,

means for shifting the sheet holding plate on a horizontal plane each time a specified volume of sheets is loaded thereon, and

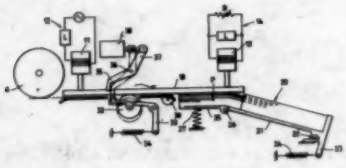
means for moving the sheet regulating member in integral relation with a horizontal movement of the sheet holding plate.

4,955,598

PAPER FEEDING APPARATUS

Ken Hiroshige, Kanagawa, and Sadayuki Ueha, No. 1793-635, Kanamori, Machida-shi, Tokyo, both of Japan, assignors to Fuji Xerox Co., Ltd. and Sadayuki Ueha, both of Tokyo, Japan

Filed Sep. 26, 1988, Ser. No. 248,856
Claims priority, application Japan, Sep. 28, 1987, 62-240779; Sep. 28, 1987, 62-240780
Int. Cl.[5] B65H 5/10
U.S. Cl. 271—267 18 Claims



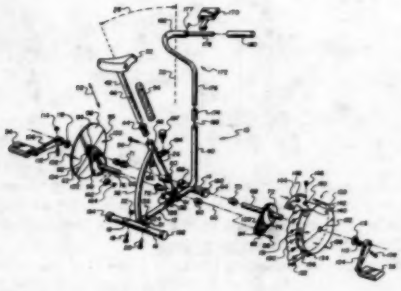
1. A paper feeding apparatus comprising:
- a flexible vibrating body made of an elastic member and adapted to be excited with a resonant frequency to produce a progressive wave;
- a driving vibrator fixed to one end of said flexible vibrating body;
- a receiving vibrator fixed to the other end of said flexible vibrating body; and
- means for urging paper against said flexible vibrating body, whereby and the paper is urged against said vibrating body so that the paper is conveyed when said flexible vibrating body is excited.

4,955,599

EXERCISE CYCLE WITH GEAR DRIVE

George Bersonnet, River Heights, and William T. Dalebout, Logan, both of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah

Filed Jan. 19, 1989, Ser. No. 299,725
Int. Cl.[5] A63B 21/00
U.S. Cl. 272—73 5 Claims



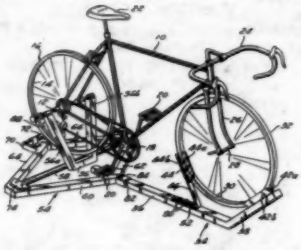
5. An exercise cycle, comprising:
- a frame for positioning on a support surface, said frame including:
  - a front support member,
  - a rear support member,
  - a base member extending between said front support member and said rear support member, and
  - a central upright member extending upwardly from said base member at a preselected angle toward said rear support member;
  - seat means attached to said central upright member to support a user thereon;
  - a flywheel rotatably mounted to said central upright member above said base member to rotate about an axis transverse thereto, said flywheel being substantially circular in cross-section and having a rim at its perimeter configured and positioned to form a recess on the inside side of the flywheel proximate said central upright member;
  - drive means attached to said central upright member sized to be within said recess and drivingly interconnected to said flywheel to cause rotation thereof;
  - pedal means adapted to said drive means to operate the drive means to cause flywheel rotation, said pedal means having pedals positioned for operation by the feet of a user on the seat means; and
  - a cover attached to said frame and being substantially the same as said flywheel in cross-section and configured to extend substantially across said central upright member to define, in association with said flywheel, a thin cylinder with said central upright member extending therethrough.

4,955,600

BICYCLE SUPPORT AND LOAD MECHANISM

Mark J. Hoffenberg, Laguna Niguel, and Robert A. Walpert, El Toro, both of Calif., assignors to Schwinn Bicycle Company, Chicago, Ill.

Continuation of Ser. No. 169,987, Mar. 17, 1988, Pat. No. 4,815,730. This application Nov. 29, 1988, Ser. No. 277,318
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.
Int. Cl.[5] A63B 21/00
U.S. Cl. 272—73 20 Claims



1. An apparatus for supporting a bicycle for accurately simulating the load and realistic feel of a bicycle during a bicycle race, said apparatus supporting the bicycle rear tire with respect to an electrically braked roller such that slippage does not occur between the rear wheel and the roller when the full weight of the rider is on the pedals to obtain maximum power, the bicycle having a frame to which are connected to seat, handlebars, pedals, and a rear tire rotatably mounted on a rear axle, the apparatus comprising:
- at least one roller having a rotational axis located in a plane substantially parallel to a substantially vertical plane containing the rear axle, the roller containing the rear tire when the bicycle is mounted on the apparatus;
- a rearwardly inclined pivoting support member pivoting about a pivot axis, the support member connecting to both ends of the rear axle so as to allow the rear axle to rotate about its longitudinal axis, while constraining the axle to pivot about the pivot axis during exercise use of said apparatus, the pivot axis being located forward of the roller, and on the opposite side of the vertical plane as the roller, where the forward direction is from the seat toward the handlebars; and
- force means cooperating with the front fork of the bicycle to exert a rearward force on the rear tire when the weight of

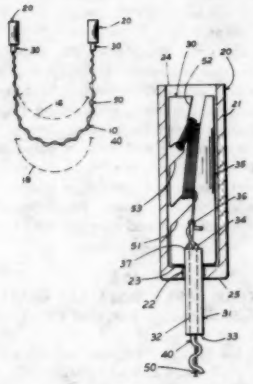
a rider shifts off the bicycle seat and toward the handlebars.

4,955,601

ALL-OCCASION ROPE

Ming-Shean Ueng, P.O. Box 396, Phillisburg, N.J. 08869

Filed Apr. 18, 1988, Ser. No. 182,835
Int. Cl.[5] A63B *5/20*
U.S. Cl. 272—75 12 Claims



1. An all-occasion jumping rope comprising two handles, two freely rotatable holders inside said handles and retained in place by a retaining means, a flexible rope attached at each end of said rope to said holders by an attaching means, a flexible string freely slidable inside said rope also attached at its ends to said holders by an attaching means, and at least one of said holders comprising means to adjust the length of said flexible string held on said holders to thereby change the length of said flexible rope between said handles.

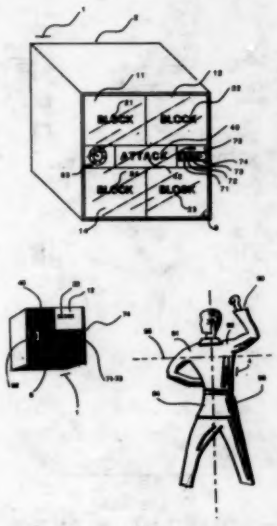
4,955,602

METHOD AND APPARATUS FOR TRAINING IN THE MARTIAL ARTS

Gerard Rastelli, 3700 Smith St., Wantagh, N.Y. 11793

Filed Apr. 25, 1988, Ser. No. 185,612
Int. Cl.[5] A63B *69/34*
U.S. Cl. 272—76 17 Claims

1. A martial arts training apparatus comprising:
screen means for display of martial arts drill commands;
said screen means having four block regions, each block region having means for rapidly and prominently displaying therein means for commanding the person to block;
an upper left block region disposed in an upper left portion of the screen means;
an upper right block region disposed in an upper right portion of the screen means;
a lower left block region disposed in a lower left portion of the screen means;
a lower right block region disposed in a lower right portion of the screen means;
an attack region, disposed upon the screen means intermediate said block regions, having means for rapidly and prominently displaying means for commanding the person to attack;
and means associated with the screen means for:
selecting a predetermined martial arts drill command sequence,
automatically displaying the means for commanding in each region for an interval,
automatically terminating said interval,
automatically displaying another means for commanding in sequence for another interval, and



automatically displaying and terminating the means for commanding without contact by the person.

4,955,603

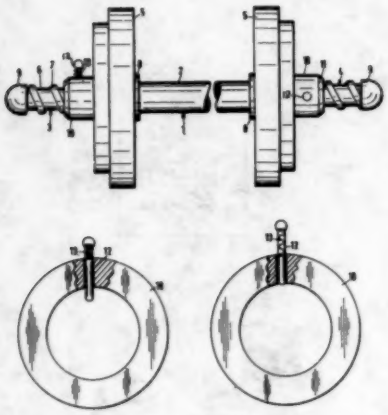
BARBELL WEIGHT LOCK

Hermann J. Becker, Theodor-Heuss-Allee 18, D-5500 Trier, Fed. Rep. of Germany

Filed May 5, 1989, Ser. No. 347,972
Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815524
Int. Cl.[5] A63B *21/075*
U.S. Cl. 272—123 16 Claims

1. In a barbell having an elongated bar component including a central handle portion and opposite end portions, weights slidable onto the end portions of the bar component, and stops disposed, respectively, between the end portions of the bar component and the central handle portion for limiting inward sliding movement of the weights along the bar component end portions, each end portion of the bar component having an external screw thread, and locking sleeves fittable over and adjustable longitudinally along the externally threaded end portions of the bar component, the improvement comprising at least one of the locking sleeves having a locking pin including an inner portion slidable transversely of its bar component end portion between a first position fitted in the groove of the screw thread for tightening and loosening rotation of said sleeve and a second position removed from said groove permitting longitudinal sliding of said sleeve along its bar compoennt end portion without rotation toward and away from the adja-

cent stop, said locking pin having an outer portion accessible from the exterior of the sleeve for selective manual movement



of the locking pin inner portion between its first and second positions.

4,955,604

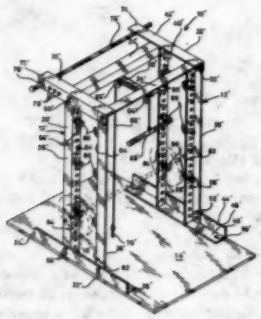
WEIGHT LIFTING RACK

David C. Pogue, 140 Lake Hills Dr., Oak Ridge, Tenn. 37830

Continuation-in-part of Ser. No. 249,340, Sep. 26, 1988, abandoned. This application Aug. 11, 1989, Ser. No. 392,780

Int. Cl.[5] A63B *21/072*

U.S. Cl. 272—123 **4 Claims**



1. A demountable multi-function weight lifting rack for supporting barbell weights for performing weight lifting exercises and for facilitating the safe performance of said weight lifting exercises, said rack comprising:

a portable base defining a platform for performing said weight lifting exercises, said base further defining opposite side edges and opposite end portions;

a frame releasably mounted on, and supported by, said base, said frame including first and second selectively spaced side portions, each said side portion defining a lower end portion releasably secured to said base proximate said opposite side edges, and an upper end portion releasably secured to first and second cross lintels joining said first and second side portions, each said side portion further including first and second selectively spaced vertical support members, each said support member defining upper and lower end portions and being provided with a plurality of selectively spaced holes disposed along at least a portion of the length of said support member, said first and second support members of each of said side portions of said frame releasably joined at said upper end portions with a header, each of said headers having a cantilevered end portion extending in a common direction from said side portions of said frame, said cantilevered end portions provided with at least one transverse hole;

a pull-up bar having opposite end portions, said end portions engaged in said holes in said cantilevered end portions of said headers; and

at least one upwardly opening weight support hook operatively associated with each side portion of said frame for releasably engaging and supporting said barbell weights, each said weight support hook being provided with a threaded bolt member for passing through said holes of said support members and a nut member threadably engaged with said bolt member for securing said hook to one said support member of said frame whereby at least one said hook is disposed between said first and second support members of each said side portion of said frame.

4,955,605

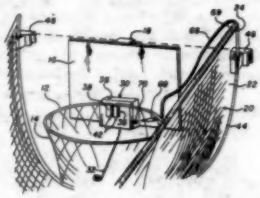
HOME BASKETBALL APPARATUS

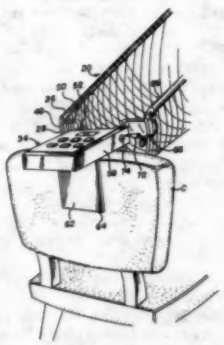
Adolph E. Goldfarb, 1432 S. Eastwind Cir., Westlake Village, Calif. 91361

Filed Feb. 9, 1989, Ser. No. 308,648

Int. Cl.[5] A63B *63/08*

U.S. Cl. 273—15 A **16 Claims**





1. An inexpensive basketball play apparatus for use in the home in combination with a door and a household article such as a chair, said apparatus comprising:

(a) a basketball hoop;

(b) support means connected to the hoop and proportioned

and arranged to releasable connect to the top of a door to support the hoop adjacent to the top of the door; and

(c) a return net assembly including:

i) an elongated net having a width defined by opposed side edges for catching a basketball after it is shot at the basket and returning it to the shooter,

ii) a first net connector means attached to one end of the net and proportioned and arranged to releasably connect to the top of the door supporting the hoop to position that one end of the net so as to at least partially enclose the area around the basketball hoop, and

iii) a second net connector means attached to the other end of the net and proported and arranged to releasably connect to a household article such as the top of a chairback to position that other end of the net spaced below and away from the basketball hoop,

said first net connector means comprising means for supporting the upper end of the return net at a plurality of points along its width so as to form that end in a generally trough-like configuration that extends above at both sides and also extends below the basketball hoop,

said second net connector means comprising means for holding the lower end of the return net at a plurality of points along its width so as to form that end in a generally trough-like configuration whereby the assembled return net provides a generally outwardly and downwardly extending channel for the basketball,

said second net connector means being constructed and arranged to be releasably clipped to the household article such as the top of a chairback, said second net connector means comprising a pair of opposed sections adapted to be positioned at opposite sides of the household article and to press inwardly against the household article to maintain the lower end of the return net in position.

4,955,606

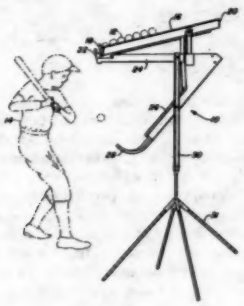
BALL PITCHING DEVICE

Thomas Leps, 34 Wolfe Grade, Kentfield, Calif. 94904

Filed Dec. 22, 1989, Ser. No. 455,999

Int. Cl.[5] A63B *69/00*

U.S. Cl. 273—26 D **8 Claims**



1. A ball pitching device comprising:

a support stand structure;

a ball capture cavity portion attached to said support stand structure, said ball capture cavity portion bearing a lip member, said lip member conditioned to capture and temporarily stabilize a ball placed in said ball cc .re cavity portion;

an initial ramp portion connected to said ball capture cavity portion, said initial ramp portion extending downward and rearward away from said ball capture cavity portion;

a final ramp portion connected to said initial ramp portion, said final ramp portion extending downward and forward from said initial ramp portion in the longitudinal direction of said ball capture cavity; and

an upwardly-curved launch ramp portion connected to said final ramp portion, said launch ramp portion extending generally beneath said ball capture cavity portion.

4,955,607

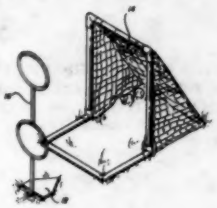
BASEBALL SPOT PITCHING PRACTICING DEVICE

Franklin Maye, 3143 Omega Ave., Simi Valley, Calif. 93063

Filed Jul. 28, 1989, Ser. No. 386,271

Int. Cl.[5] A63B *63/00*

U.S. Cl. 273—26 A **4 Claims**



1. A baseball training device for practicing baseball pitching, said device comprising: a supporting base; a first elongated rod attached to and extending upwardly from said base; a first loop member attached to the upper end of said first elongated rod; a second elongated rod attached to and extending upwardly from said first loop member in axial alignment with said first elongated rod; and a second loop member attached to the upper end of said second elongated rod and facing in the same direction as said first loop member; said first elongated rod having a predetermined length so as to place said first loop at the lower end of a regulating baseball strike zone, and said second elongated rod having a predetermined length so as to place said second loop member at the upper end of said regulation baseball strike zone.

4,955,608

ATHLETIC MOVEMENT TRAINER

Dougherty Patrick F., and Chris A. Ashby, both of 2615 N. Causeway Blvd., Mandeville, La. 70448

Filed Feb. 13, 1989, Ser. No. 310,299

Int. Cl.[5] A63B *69/00*

U.S. Cl. 273—29 A **7 Claims**

1. A device for aiding the training of an athlete comprising:

a. first and second straps for placement about the ankles of an athlete;

b. an elongated, elasticized member having two ends;

c. means for receiving the elongated member, the receiving means including an opening with an interior of a size

greater than the transverse dimension of the elongated member for allowing unrestricted passage of the elongated member through the opening;

d. means for positioning the receiving means at an athlete's waist near the center of an athlete's back; and

the elongated member is received by the opening one end is connected to the first strap and the other end is connected to the second strap when the device is worn by an athlete.

4,955,609

GOLF CLUB WITH GREEN SURFACE REPAIR DEVICE

Albert D. Kassen, 4972 Barnstable La., Cincinnati, Ohio 45244

Filed Sep. 1, 1989, Ser. No. 401,836

Int. Cl.[5] A63B *53/00*

U.S. Cl. 273—162 F **8 Claims**

6. A golf club grip for converting a golf club having a shaft and ball striking head into a dual function implement including a golf club and a green surface repair tool, said grip comprising;

an elongated grip tube having an opening therein for receiving the shaft of a golf club;

a housing formed on said grip outside said opening;

a selectively extensible green repair member disposed in said housing;

means for extending and retracting said tool member with respect to said housing, said tool remaining secured to said grip when extended for repairing a green surface.

4,955,610

DRIVING IRON GOLF CLUB HEAD

William W. Creighton, 1845 S. Las Palmas Cir., Mesa, Ariz. 85202, and George T. Venetis, 508 E. Mariette Ave., Phoenix, Ariz. 85012

Filed Feb. 27, 1989, Ser. No. 316,082

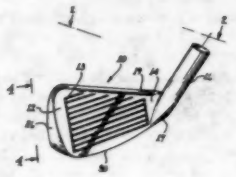
Int. Cl.[5] A63B *53/04*

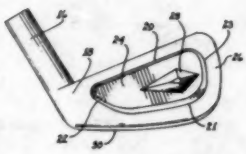
U.S. Cl. 273—169 **8 Claims**

1. An iron golf club comprising:

a hosel having a shank end portion, said shank end portion having a front and back surface; and

a club head having a sole, a top, a toe, a heel, a rear fall, and a striking face, said striking face having a leading edge, and a trailing edge, said heel integrally formed with said shank end portion, said striking face having a configuration that contacts said back surface of said shank end portion, said front surface of said shank end portion having a tapered portion, said tapered portion extending from





said leading edge of said striking face upward and away from said striking face for a predetermined distance.

4,955,611

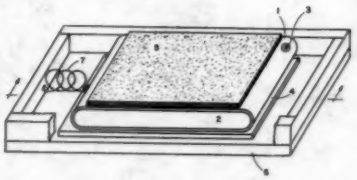
GOLF PRACTICE DEVICE

Bynum W. Moller, P.O. Box 688, Kerrville, Tex. 78029

Filed Oct. 21, 1988, Ser. No. 261,238

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—195 A **7 Claims**



1. A golf practice device comprising a fully enclosed, air filled, flexible cushion with the top and bottom parts being relatively flat and parallel, with the top surface of the top part including a mat of upstanding, grass-simulating bristles, and being sufficiently durable to withstand being struck by a golf club, with two pairs of relatively parallel sides, and with a rigid base piece to which the bottom surface of said cushion is attached the combination of said mat, cushion and rigid base defining an integral unit adapted to fit on a sub base which is shaped to receive said unit and allow it to move forward thereon as a unit when the mat is struck by a golf club.

4,955,612

GOLF SWING TRAINING AID

William K. Tai, E. 14725 Terra Verde Ct., Veradale, Wash. 99037

Filed Dec. 29, 1989, Ser. No. 458,780

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—200 B **11 Claims**

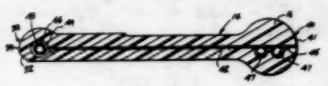
9. A golf-swing practicing apparatus comprising:

a support base;

an elongated molded rigid radial support arm mounted to the support base for rotation relative thereto, the support arm having opposed longitudinal ends and respective external longitudinal end surfaces;

the support arm including a central rigid reinforcing rod embedded therein and extending in a longitudinal direction along a substantial longitudinal length of the arm;

one of the opposing ends of the support arm comprising an integrally formed solid mass golf-ball sized object for hitting by a golfer; and



the central rigid reinforcing rod including a portion which extends longitudinally into the solid mass golf-ball sized object and to the one support arm longitudinal end to be flush with the external longitudinal end surface at the one longitudinal end, the portion including a section within the golf-ball sized object which is bent to extend transversally away from the longitudinal direction.

4,955,613

POLYBUTADIENE GOLF BALL PRODUCT

Paul M. Gendreau, Swansea, and Lauro C. Cadorniga, S. Dartmouth, both of Mass., assignors to Acushnet Company, New Bedford, Mass.

Filed Mar. 6, 1989, Ser. No. 319,640
Int. Cl.[5] A63B *37/00, 37/06, 37/12*
U.S. Cl. 273—218 **10 Claims**

1. A golf ball product comprising a mix of two polybutadienes, said mix comprising about 85 to about 15 phr of a nickel- or cobalt-catalyzed polybutadiene having a cis-1,4 content above about 40% and a Mooney viscosity of no greater than about 50 and about 15 to about 85 phr of a lanthanide-catalyzed polybutadiene having a cis-1,4 content above about 40% and a Mooney viscosity of no greater than about 50; a metal salt of an unsaturated carboxylic acid; and a free radical initiator.

4,955,614

WORD FORMING BY ELIMINATION GAME

Paulette Buda, 22 Sweet Briar La., Holmdel, N.J. 07733

Filed Jan. 26, 1989, Ser. No. 302,182
Int. Cl.[5] A63F *9/16*
U.S. Cl. 273—240 **1 Claim**

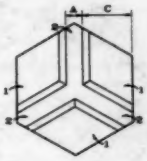
1. A word-forming game played by a plurality of players comprising a plurality of pads, each of said pads having a plurality of sheets, each of said sheets containing the letters of the alphabet located thereon and being divided into equal and separate areas for notes and scoring of players, and a plurality of stacks of cards, each card comprising two sides, one of said sides containing at least three predetermined words thereon, each of said words comprising at least five letters, none of said words containing double letters, and located on the other side of said cards point values set in increasing amounts according to the degree of difficulty associated with said words.

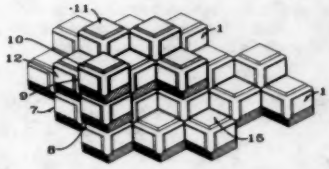
4,955,615

HEXAGONAL GAME TILES

Brian D. Eck, 10901 N. Florida, Oklahoma City, Okla. 73120, assignor to Brian Daniel Eck, Oklahoma City, Okla.

Filed Aug. 2, 1989, Ser. No. 388,678
Int. Cl.[5] A63F *3/00*; A63H *33/08*
U.S. Cl. 273—241 **2 Claims**





1. A game or amusement device consisting of a set of hexagonal playing pieces, which when arrayed side to side into a horizontal honeycomb patterned playing field, form the foundation for successive levels of interlocking play, said individual hexagonal pieces each have male protrusions on one surface, which match the female indentions on the opposite side of the piece, so that each tile interlocks with every other piece,

said individual hexagonal pieces each have three male rhombic protrusions projecting up from three opposing corners on one surface, so that when the rhombic shapes of three adjoining pieces are together, they complete a single hexagonal male protrusions matching the hexagonal female indention on the underside of every piece; thus a fourth piece may rest in an interlocking fashion equally atop the three pieces beneath it.

4,955,616

BOARD GAME

David E. Ingalls, 113 Tara Court Apt. D, Shepherd, Mich. 48883

Filed Sep. 25, 1989, Ser. No. 411,693
Int. Cl.[5] A63F *3/00*
U.S. Cl. 273—249 **3 Claims**

1. A method of playing a board game, comprising the steps of:

providing:

a rectangular game board, said game board having indicia designating a plurality of interconnected movement paths, each of said movement paths formed by a plurality of interconnected sequential spaces;

a first movement path extending along a first side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with attainment of education;

a second movement path extending along a second side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with family life;

a third movement path extending along a third side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various business activities;

a fourth movement path extending along a fourth side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various financial events;

a start space at an intersection of said first and fourth movement path;

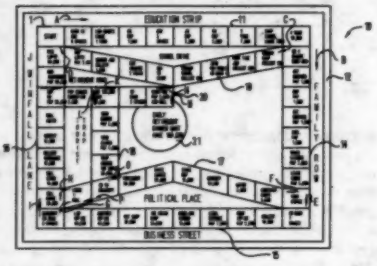
a fifth movement path extending between said second and fourth movement paths and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with student summer activities;

a sixth movement path extending between said second and fourth movement paths and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with political activities;

a central finish zone on said game board;

a seventh movement path extending between said fourth movement path and said finish zone and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various retirement activities;

an eighth movement path extending between said sixth and seventh movement paths and formed by a plurality of sequential spaces each bearing indicia designating events



and financial transactions associated with various vacation activities;

one numbered die;

a plurality of game markers for movement around said movement paths;

a plurality of score sheets, each of said score sheets having indicia for tabulating educational, family, political, business and financial activities of a game player associated with movement of a game marker around said movement paths;

selecting an initial player from a plurality of players;

said initial player rolling said die and moving a respective one of said game markers along said first movement path toward said second movement path in accordance with a number of spaces indicated by said die;

play continuing in sequential fashion, with each player recording events and financial transactions on a respective score sheet in accordance with indicia designated on movement path spaces;

each player's game marker restricted to movement on said first and fifth movement paths until a predetermined educational event has been achieved;

each player's game marker allowed to move along said second movement path upon achieving said predetermined educational event;

each player optionally moving a respective game marker along said third or said sixth movement paths upon reaching an end of said second movement path;

each player's game marker restricted from movement on said fourth movement path until a predetermined financial total has been achieved;

each player's game marker restricted for movement to said finish zone until a predetermined financial total has been achieved; and

continuing play in sequential fashion until a player achieves said predetermined financial total and moves a respective game marker to said finish zone as indicated by an exact movement total on said die.

4,955,617

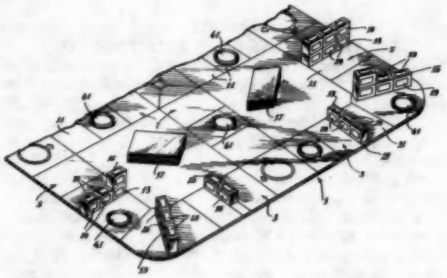
KIT FOR BOARD GAMES

Stanley I. Mason, Jr., 61 River Rd., Weston, Conn. 06883; Elizabeth L. Fuller, 72 River Rd., both of Weston, Conn. 06883, and Roy E. Doty, 35 Grey Hollow Rd., Norwalk, Conn. 06850

Continuation of Ser. No. 282,747, Dec. 12, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 407,556

Int. Cl.[5] A63F *3/00*

U.S. Cl. 273—256 **5 Claims**



1. A board game kit including

movable playing pieces,

movable barriers,

a game board, said board having a circumferential track thereon, said track including pluralities of sequential spaces to receive said movable pieces, as a player moves them around said track, said sequential spaces running the width of said track, and barrier spaces running across the width of said tracks to receive said movable barriers, said barrier spaces being positioned between pairs of said pluralities of sequential spaces,

said board including at least one diametrical track interconnecting opposite sides of said circumferential tracks, said diametrical track being formed of additional said sequential spaces to receive said movable pieces, and

said movable barriers being shaped such that said barriers may be secured to one another end to end or stacked one above another,

whereby said one or more of said movable barriers can be positioned in a said barrier space thereby providing deterrents to moving said movable pieces in said circumferential track while playing said game.

4,955,618

MOUNTAINEERING STRATEGY BOARD GAME

Joseph R. Growall, 518 W. Columbia St., Colorado Springs, Colo. 80907

Filed Jun. 19, 1989, Ser. No. 368,423

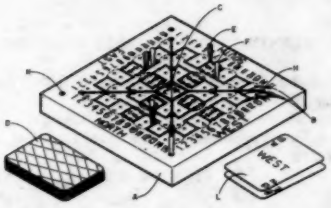
Int. Cl.[5] A63F *3/00*

U.S. Cl. 273—258 **10 Claims**

1. A board game apparatus comprising:

a. a game board which bears upon the face thereof, a multiplicity of spaces arranged in a grid pattern with indicia

assigned to each column and row of the grid to form a coordinate system, boundary lines which divide said grid into labeled sections, each labeled section containing various segments of said columns and rows of grid spaces, said segments comprising section rows of grid spaces which are numbered so that the section rows within each section may be distinguished from one another, a route of movement and alternates thereof for each player to follow from spaces on the grid designated as start locations to a space on the grid designated as a finish location, wherein said route of movement and alternates thereof incorporate spaces which are located on the grid and which can be identified using said coordinate system, and a pyramidal extraplanar rotating device having the same number of sides adjoining its apex as the number of sections into



which the grid has been divided, wherein each side of said device is numbered for regulating token movement in the section of the grid to which that particular side of said device corresponds,

b. a deck of playing cards which correlates to said coordinate indicia and said section labels on said game board grid,

c. a plurality of first playing tokens, each token representing a player's position as the player advances along said route of movement and alternates thereof,

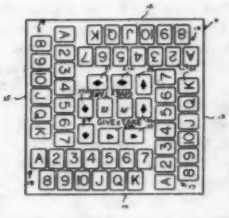
d. a plurality of second playing tokens, each second token marking the space on a player's route of movement to which said first playing token may return as the result of a setback imposed on said first playing token by an opponent.

4,955,619

CARD GAME APPARATUS AND METHOD

Robert R. Christman, 1135 N. Frederic St., Burbank, Calif. 91505

Filed Aug. 7, 1989, Ser. No. 390,973
Int. Cl.[5] A63F *3/06*
U.S. Cl. 273—273 **4 Claims**



1. A method of playing a card game including a plurality of players comprising the steps of,

(a) providing a game board and forming four player stations on said game board, and

(b) providing four decks of playing cards wherein each of said four decks each includes an equal first predetermined number of playing cards, and

(c) providing a fifth directional card deck of playing cards of a second predetermined number of playing cards contained wherein said second predetermined number is formed less than said first predetermined number, and

(d) directing each of said players to arrange said playing cards upon available spaces formed on said game board, and

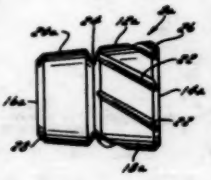
wherein (b) further includes the step of obtaining said four decks of playing cards to each included cards of the suits including diamonds, hearts, clubs, and spades, and further including the step of segregating each of said suits to form each of said decks of a single suit different from a subsequent deck of said four decks of playing cards, and additionally including the steps of adding four wild cards to each of said decks.

4,955,620

AERIAL GAME PROJECTILE

Thomas E. Reinke, 3975 North 71st St., Milwaukee, Wis. 53216

Filed Jul. 24, 1989, Ser. No. 384,506
Int. Cl.[5] A63B *65/00*
U.S. Cl. 273—428 **8 Claims**



1. An aerial game projectile useful in batting and throwing games comprising a generally frustro conical body having closed ends and a side wall being formed externally with a plurality of flights extending generally longitudinally of the projectile on a portion thereof, said side wall defining a head portion and a base portion, said base portion having a diameter which is larger than said head portion, said flights being formed in said base portion only, and said side wall being provided with an annular groove separating said base portion from said head portion.

4,955,621

GASKET

Robert R. Skrycki, Grosse Ile, Mich., assignor to JPI Transportation Products, Inc., Ann Arbor, Mich.

Filed Sep. 22, 1989, Ser. No. 410,877
Int. Cl.[5] F16J *15/12*
U.S. Cl. 277—166 **4 Claims**

1. A gasket for sealing a joint between adjacent surfaces of mating mechanical components in order to prevent fluid leaks therebetween comprising:

a substantially flat planar gasket core having attachment bolt openings extending therethrough, and having fluid pas-

sage openings formed therein, said openings being arranged in a predetermined spaced relation, at least one seal member of predetermined width and being formed of a compressible material on said core arranged so as to circumscribe at least one of said fluid openings, said predetermined width being sufficiently narrow to enable displacement of the seal material in directions substantially parallel to the plane of said core, said seal member also being of a predetermined height in a direction perpendicular to the plane of said core;

a compression limiter formed of the same compressible material as said seal member and being disposed upon said core in close proximity to said bolt openings but spaced from said seal member, said limiter being in a plane substantially parallel to the plane of said core and being of an area sufficiently great to be substantially incompressible in a direction parallel to the height of said seal member, the height of said limiter being less than said height of said seal member so that when said surfaces are moved toward each other said seal member will be compressed until said limiter is engaged between said surfaces.

4,955,622

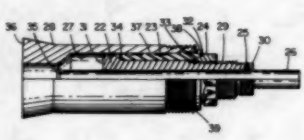
STOP APPARATUS FOR USE IN COLLETS

Donald M. Peterson, Bellevue, Wash., assignor to James A. Haggerty and Thomas E. Hawkes

Continuation-in-part of Ser. No. 180,183, Apr. 11, 1988. This application Oct. 11, 1988, Ser. No. 255,860

Int. Cl.[5] B23B *31/20*

U.S. Cl. 279—15 **1 Claim**



1. The combination of stop apparatus for use in a collet and said collet, said collet having a collet bore, said apparatus being insertable a distance into said collet bore and comprising:

a body having a body bore, an outer surface of revolution having an axis, a first end and a second end, said outer surface comprising in sequence a flange at said first end, a cylindrical portion, a threaded portion and a knurled portion, said flange having a first conical surface facing said cylindrical portion,

a resilient sleeve surrounding said cylindrical portion and having an outside diameter, said sleeve being slotted longitudinally whereby said diameter may be varied, said sleeve having a sleeve bore, a first sleeve end and a second sleeve end, conical chamfers in said sleeve bore at said first and second sleeve ends and a radial flange at one of said sleeve ends,

a rod slidable in said body bore and having a stop face

means for preventing said rod from sliding in said body bore,

said apparatus further comprising a nut threadable on said threaded portion and having a second conical surface and being threaded onto said threaded portion with said second conical surface facing said cylindrical surface whereby when said nut is turned on said body such that said second conical surface approaches said first conical surface, said conical surfaces and said chamfers cooperate to cause said diameter to increase and vice versa, said knurled portion providing means for preventing said body from turning with said nut,

whereby with said sleeve installed on said body with said radial flange at said one of said sleeve ends next to said nut and said apparatus inserted into said collet bore, said distance is limited by contact between said radial flange and said collet, and further, whereby when said nut is turned such that said second conical surface approaches said first conical surface, said diameter increases such that said sleeve engages said collet bore and holds said apparatus in place in said collet, and further whereby when said rod is slidably adjusted in said body bore and then prevented from sliding by said means for preventing it from sliding, said stop face is positioned with respect to said collet,

the improvements comprising, in combination: (1) location of said nut outside of said collet bore by the limitation of said distance by contact between said radial flange and said collet, said location of said nut rendering it readily accessible for adjustment for installation and removal of said apparatus and (2) location of said nut and said knurled portion outside of said collet, whereby both said body and said nut are accessible for adjustment of said apparatus.

4,955,623

SELF-TIGHTENING AND LOCKABLE HAMMER-DRILL CHUCK

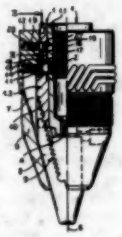
Günter H. Röhm, Heinrich-Röhm-Strasse 50, D-7927 Sontheim, Fed. Rep. of Germany

Filed Oct. 31, 1989, Ser. No. 429,843

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1989, 3914311

Int. Cl.[5] B23B *31/10*

U.S. Cl. 279—60 **11 Claims**



1. A drill chuck for rotation about an axis of a drill spindle to rotate a drill bit about and reciprocate it along the axis, the chuck comprising:

a chuck body securable to the spindle;

a sleeve rotatable but axially nondisplaceable on the chuck body;

a plurality of jaws engaged between the sleeve and chuck body;

means including angled guides and a screwthread formed on the body, sleeve, and jaws for radial displacement of the jaws toward each other on relative rotation of the sleeve and chuck body in a tightening direction and for radial displacement of the jaws away from one another on opposite relative rotation in a loosening direction;

a locking-ring body axially displaceable between a rear unlocked position and a front locking position on the chuck body, the sleeve and locking-ring body having complementary axially open and projecting formations fittable within each other to inhibit substantial relative angular movement of the ring body and sleeve about the axis only in the front locking position, the formations being out of engagement with one another in the rear unlocked position; and

a projection fixed in and extending radially from one of the bodies toward the other body and having predetermined angular and axial dimensions, the other body being formed with

an angularly extending slot having angularly opposed and spaced end surfaces spaced apart angularly by a distance greater than the angular dimension of the projec-

tion and axially opposed and spaced side surfaces spaced axially by a distance generally equal to the axial dimension of the projection, whereby when the projection is engaged in the slot same limits relative angular displacement of the bodies, and

an axially backwardly extending cutout opening axially forward into the slot adjacent one of the end surfaces thereof at a mouth having an angular dimension generally equal to the axial dimension of the projection, whereby the cutout only allows axial travel of the locking ring into its locked position when the projection is aligned axially with the cutout at the one end surface of the slot.

4,955,624

WHEELCHAIR WITH HEIGHT ADJUSTABLE SEAT

Guo Jeun-Long, 7th Fl. No. 118-4 Sec. 1 San-Mian Road, Taichung, Taiwan

Filed Apr. 26, 1989, Ser. No. 344,238

Int. Cl.[5] B62B *7/06*; B62M *1/14*

U.S. Cl. 280—42 **2 Claims**

1. A wheelchair with height-adjustable seat, said wheelchair comprising:

first and second side frames each having front and back ends and each comprising a vertically disposed rigid frame which includes a back-supporting frame element extending vertically from said back end of said frame, and a pair of spaced, vertically oriented guide rods positioned between the front and back ends of said frames, each having therein an elongated guide slot provided with a plurality of recesses extending laterally from and spaced along an edge thereof;

a foldable back element interconnecting said back-supporting frame elements;

a pair of crossed telescoping members interconnecting said side frames at the back end thereof for supporting said side frames in vertically disposed parallel relationship for movement toward and away from one another between a collapsed position and an open position;

first and second L-shaped seat support members, and securing means for releasably connecting said first and second seat support members between the spaced guide rods of said first and said second side frames, respectively, at an adjusted height selectable in increments corresponding to the spacing between said laterally extending recesses; and

a rectangular seat disposed forwardly of said back element and pivotally connected at one side to one of said seat support members and adapted to be supported horizontally and to be releasably secured at the opposite side to the other of said seat support members or, alternatively, to be moved to a vertically extending position for allowing movement of said side frames toward one another to said collapsed position.

4,955,625

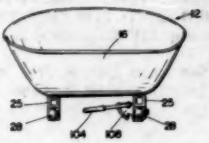
SWIVEL WHEEL WHEELBARROW

George W. Herndon, 806 N. Dawson St., Thomasville, Ga. 31792

Continuation-in-part of Ser. No. 185,486, Apr. 25, 1988, Pat. No. 4,854,601. This application Jun. 12, 1989, Ser. No. 364,891

Int. Cl.[5] B62B *1/18*

U.S. Cl. 280—47.31 **29 Claims**



1. Support structure for a single-wheeled portable vehicle, comprising:

spaced beams;

a wheel fork having spaced legs defining a longitudinal axis and a post projecting from the legs, the post defining a longitudinal axis about which the wheel fork can pivot, the post including a lower portion adjacent the legs and an upper portion removed from the legs;

a lower yoke support rigidly connected to, and extending laterally between, the beams, the lower yoke support being connected to the lower portion of the post;

an upper yoke support spaced from the lower yoke support and connected to the upper portion of the post and the beams; and

means for selectively preventing the wheel fork from pivoting about the longitudinal axis of the post, said means including a first member connected to the lower yoke and a second member connected to the wheel fork, the first member being movable laterally toward and away from the wheel fork while being maintained in a stationary axial position, and the second member being maintained rigidly connected to the wheel fork for movement therewith, the first member being movable from a first position where the first and second members are engaged and pivoting of the wheel fork is prevented to a second position where the first and second members are disengaged and pivoting of the wheel fork is permitted.

4,955,626

SKATEBOARDS

Eric O. M. Smith; James Fisher, and Simon King, all of P.O. Box 650228, Benmore, 2010, South Africa

Filed Jan. 25, 1989, Ser. No. 301,494

Claims priority, application South Africa, Jan. 28, 1988, 88/0576

Int. Cl.[5] A63C *17/01*

U.S. Cl. 280—87.042 **15 Claims**

1. A skateboard comprising two footboards, each of the footboards including a foot platform and wheel-set which carries two wheels in axial alignment fixed to the underside of the platform, a spacer element for holding the footboards in a spaced relationship and a pivot arrangement having a vertical pivot axis connecting each footboard to the spacer element to enable both footboards to pivot about said vertical pivot axis

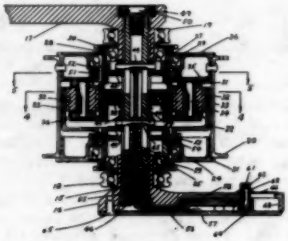
relatively to the spacer element thereby providing movement of said wheels which corresponds to the movement of said footboards.

4,955,627

FIVE SPEED CHAINLESS DRIVE FOR HEAVILY LOADED PEDAL POWERED TRICYCLES

Dirck T. Hartmann, 4121 Morning Star Dr., Huntington Beach, Calif. 92648

Filed Jun. 9, 1989, Ser. No. 363,874
Int. Cl.[5] B62M *1/08*; F16H *3/44*
U.S. Cl. 280—236 **6 Claims**



1. In a pedal powered tricycle including a frame, a driving wheel with a central hub, a pedal drive shaft on the axis of said wheel and mounted in bearings in said frame for concentric rotation with said hub, an improved five speed chainless drive located within said hub for concentric rotation therewith and comprising:

an externally toothed sun gear rotatably mounted in a fixed axial position on said pedal drive shaft;

external sun gear locking means operative for selectively locking said sun gear to said frame;

a planet gear carrier rotatably mounted and axially moveable on said pedal drive shaft;

multiple planet gears rotatably mounted on said planet gear carrier with each of said multiple planet gears in constant mesh with said sun gear;

an internally toothed ring gear rotatably mounted in a fixed axial position on said pedal drive shaft with said ring gear in constant mesh with all of said multiple planet gears;

external ring gear locking means operative for selectively locking said ring gear to said frame;

drive means operative for alternating during either said sun gear or said ring gear or said planet gear carrier from said pedal drive shaft;

a first one way clutch coupled between said ring gear and said hub for driving said hub from said ring gear with a means for rendering said first one way clutch inoperative through engagement of said drive means with said ring gear;

a second one way clutch coupled between said sun gear and said hub for driving said hub from said sun gear with a means for rendering said second one way clutch inoperative through engagement of said drive means with said sun gear;

a drive plate coupled between said planet gear carrier and said hub for driving said hub from said planet gear carrier with a means for decoupling said hub from said drive plate for independent rotation thereof when said drive means engages said planet gear carrier; and

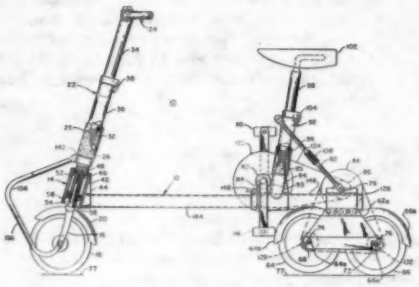
a pair of pedal crank arms fixed on opposite ends of said pedal drive shaft for rotation said outside frame.

4,955,628

MINI FOLDABLE CYCLE

David Chiu, 252 Indian Head Rd., Kings Park, N.Y. 11754-4804

Division of Ser. No. 109,660, Oct. 19, 1987, Pat. No. 4,824,130.
This application Feb. 16, 1989, Ser. No. 311,302
Int. Cl.[5] B62K *5/02*
U.S. Cl. 280—239 **9 Claims**



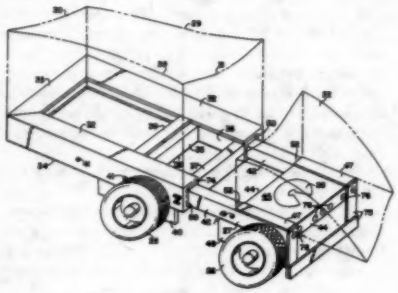
1. The method of assembling and propelling a vehicle on a pavement comprising the steps of mounting a steerable single wheel on the front of said vehicle, mounting two single wheels in tandem with each other at the rear of said vehicle and the front wheel in tandem being raised and fixed above the level of the level of the steerable wheel and the rear wheel in tandem so as not to make contact with a smooth pavement during use of said vehicle, and operating said vehicle by transferring drive from a source of power on said vehicle continuously to said rear wheels in unison.

4,955,629

COVERTIBLE CHASSIS FOR A SEMITRAILER

E. T. Todd, Jr., 13603 Sattler Rd., Jacksonville, Fla. 32226, and John R. Shivar, 2806 DuPone Ave., Jacksonville, Fla. 32217

Filed Aug. 30, 1989, Ser. No. 400,386
Int. Cl.[5] B62D *53/08*
U.S. Cl. 280—407 **20 Claims**



1. Convertible chassis for a semitrailer having two sides, a front, and an openable rear for access to inside space, a forward pair of wheels and a rearward pair of wheels mounted in first spaced tandem relationship adjacent said rear when chassis is in a retracted position, said chassis comprising:

(a) a main support section having a pair of parallel lengthwise main support beams positioned under and extending along said sides from said front to said back, and sufficient lateral main cross beams fastened to both said support beams to form a rigid main frame to support said semitrailer;

(b) an intermediate dolly having a generally rectangular rigid support frame slidable lengthwise telescopically

within said main support beams and having attached thereto said forward pair of wheels, said dolly being slidable for a distance substantially equal to the distance between said forward pair of wheels and said rearward pair of wheels in said first spaced tandem relationship; with a first stop means to prevent said dolly from being slidable rearwardly beyond said rear of said main frame;

(c) a connector carriage to which is attached said rearward pair of wheels, and carriage a fifth wheel connector plate facing upwardly from said generally aligned with said rearward pair of wheels and midway between them;

(d) said connector carriage including a pair of parallel lengthwise carriage support beams slidable lengthwise telescopically within said dolly support frame and within said main support beams with a second stop means to permit said connector carriage to extend rearwardly of said rear of said main frame a distance suitable to permit attachment of a trailer to said semitrailer via said fifth wheel with a minimum of appropriate lengthwise spacing between said rear of said semitrailer and the forward portion of said trailer; and

(e) means to selectively lock and unlock said main frame to said dolly and to said connector carriage to prevent or permit, respectively, mutual telescopic sliding movement thereamong.

4,955,630

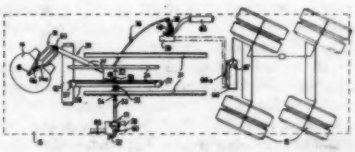
FIFTH WHEEL ACTIVATED TRAILER STEERING

Axel E. Ogren, 855 S. 12th Ave., LeGrange, Ill. 60525

Filed Jun. 5, 1989, Ser. No. 362,336

Int. Cl.[5] B62D *13/00*

U.S. Cl. 280—419 **20 Claims**



1. A power steering system for trailers of the type having steerable rear trailer wheels and a front coupling pin for coupling to and uncoupling from a tractor having a slotted fifth wheel with a slot receiving the coupling pin of the trailer which comprises, a slide mounted under the trailer for fore and aft movement, a link having a rear end pivotally mounted on said slide and a front end swingable laterally about the pivoted rear end, a tongue pivoted on the front end of the link shaped to fit the slot of the tractor fifth wheel, means driving the slide to move the tongue into and out of said slot of the fifth wheel, said tongue when seated in said slot of the fifth wheel swinging said link laterally as the tractor turns relative to the trailer, a power steering assembly on said trailer for said steerable rear trailer wheels, a power steering valve controlling said power steering assembly, and means connecting said link with said power steering valve to effect steering of said steerable rear trailer wheels with the tractor as the tractor is turned relative to the trailer.

4,955,631

FIFTH WHEEL COUPLING FOR ALLOWING AND CONTROLLING SIDE TO SIDE SWAY

Willard W. Meyer, 1380 Illinois St. SW., Huron, S. Dak. 57350

Filed Apr. 17, 1989, Ser. No. 339,397

Int. Cl.[5] B62D *53/08*

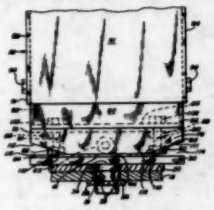
U.S. Cl. 280—438.1 **6 Claims**

1. A fifth wheel hitch for connecting a frame of a pickup truck, comprising

a rigid upright standard having an upper end connectable to the frame of such a camper and protruding downwardly therefrom toward the fifth wheel mounting on the truck,

a fifth wheel supporting plate underlying a lower end of the upright standard and having a connection pin depending therefrom to be supported on and connected to the fifth wheel mounting on the truck,

a hinged connection between and affixed to said supporting plate and to the upright standard and oriented to tilt about



a hinge axis extending longitudinally of the truck and mobile camper, and

a pair of rigid stops adjacent the hinged connection and between the supporting plate and upright standard to limit the tilting of the standard and trailer relative to the supporting plate, each of the rigid stops being vertically adjustable to vary the amount of tilting of the standard and trailer relative to the supporting plate.

4,955,632

SAFETY FASTENINGS FOR "SURF" SNOWBOARDS

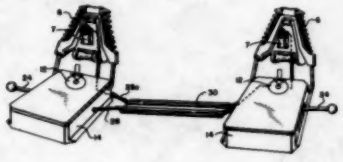
Adriano Prestipino Giarritta, Via Einaudi, 21/bis-10052 Bardonecchia Turin, and Fabrizio Robba, Frazione Les-Arnauds, 25-10052 Bardonecchia Turin, both of Italy

Filed Mar. 29, 1989, Ser. No. 330,161

Claims priority, application Italy, Mar. 30, 1988, 67286 A/88

Int. Cl.[5] A63C *5/00*

U.S. Cl. 280—607 **3 Claims**



1. Safety fastenings for snowboards having interdependent connecting means between twin devices on each fastening, which cause the automatic reciprocal opening and immediate release of either fastening should the other fastening release the corresponding ski boot each one of said devices comprising a flat boxed body which cooperates with a grip (4) for frontally fixing the ski boot and fastening means (5) which block the heel of the ski boot; said fastening means (5) being provided with a control lever (7) which activates a heel grip of the fastening means said lever (7) being mechanically connected to a movable section (25) which is part of the twin fastening devices, so that traction generated by said member (25) is transmitted to the lever (7) of the other fastening device.

4,955,633

ADJUSTING DEVICE FOR A SKI BINDING

Karl Stritzl; Henry Freisinger, both of Vienna; Hubert Würthner, Hainburg/Donau, and Andreas Riegler, Vienna, all of Austria, assignors to TMC Corporation, Switzerland

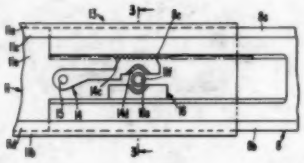
PCT No. PCT/EP87/00587, § 371 Date Jun. 10, 1988, § 102(e) Date Jun. 10, 1988, PCT Pub. No. WO88/04562, PCT Pub. Date Jun. 30, 1988

PCT Filed Oct. 8, 1987, Ser. No. 251,647

Claims priority, application Austria, Dec. 18, 1986, 3363/86

Int. Cl.[5] A63C 9/00

U.S. Cl. 280—633 8 Claims



1. An adjustment device for a ski binding comprising:

a slide mounted on a ski, the slide including a plurality of legs and a base extending between the legs;

at least one locking member pivotably mounted on the base on a pivot axis, the locking member including a plurality of teeth;

a guide plate for guiding the slide, the guide plate extending in a longitudinal direction of the ski and comprising a plurality of prongs and at least one strip including a plurality of teeth; and

adjustment means for adjusting the slide relative to the guide plate, the adjustment means adapted to be actuated for bringing the teeth of the locking member into engagement with the teeth of the strip and for bringing one of the prongs of the guide plate into frictional engagement with one of the legs of the slide.

4,955,634

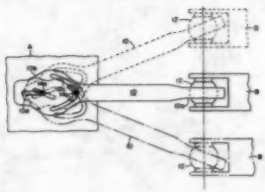
WHEEL SUSPENSION LINKAGE

Stephen L. Smith, 5406 Timber Pond, San Antonio, Tex. 78250

Filed Jul. 24, 1989, Ser. No. 383,727

Int. Cl.[5] B62D 7/06; B60G 3/18

U.S. Cl. 280—675 10 Claims



1. A wheel suspension system for an automotive vehicle having a frame and a plurality of wheels, each wheel including a hub unit, the improvement comprising:

a wishbone link for connecting the wheel hub to the frame;

said wishbone link having a stem portion and two diverging arm portions;

universal joint means for connecting the end of said stem portion to said wheel hub;

the other end of each of said arm portion defining a curved slot in a vertical plane and a horizontal slot adjacent said curved slot;

bracket means on said frame;

a pair of horizontal pins fixedly mounted in transversely spaced relationship to said frame and respectively engagable with said vertical curved slot and said horizontal slot;

the curvature of said curved slot and the spacing of said pins being selected to cause the end of said stem portion of said wishbone link to move in a substantially vertical linear path relative to said frame.

4,955,635

SUSPENSION OF VEHICLE HAVING LINKS ARRANGED TO INTERSECT A COMMON INBOARD PIVOT AXIS

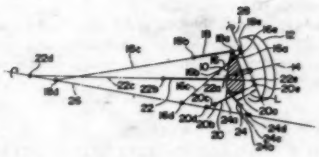
Tetsunori Haraguchi, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Apr. 17, 1989, Ser. No. 339,251

Claims priority, application Japan, Apr. 19, 1988, 63-95999

Int. Cl.[5] B60G 3/26

U.S. Cl. 280—675 7 Claims



1. A suspension of a vehicle for mounting a wheel to a vehicle body in a manner of allowing bounding an rebounding and toe change movement of the wheel, comprising:

a wheel supporting member for supporting the wheel to be rotatable about an axis of rotation, and a plurality of links each being pivotably connected at one end thereof with said wheel supporting member and at another end therof with the vehicle body, said plurality of links including a first group of links comprising at least one upper link and at least one lower link for supporting said wheel supporting member from the vehicle body principally for bounding and rebounding movement of the wheel relative to the vehicle body regulated by an angular deformation of a quadrilateral formed of said upper and lower links and spanning portions of said wheel supporting member and the vehicle body extending between points thereof for pivotal connection with said upper and lower links and a second group of links for principally restricting toe change movement of the wheel relative to the vehicle body, wherein said first and second groups of links are so arranged that when said wheel supporting member is at a predetermined standard position between bounding and rebounding displacements thereof, a central axis of each said link intersects a first phantom straight line on an inboard side thereof.

4,955,636

SAFETY INSTALLATION FOR CARRYING CHILDREN

Jukka Sundberg, Helsingfors, and Bror Martin, Västerskog, both of Finland, assignors to Electrolux Autoliv AB, Stockholm, Sweden

Filed Apr. 12, 1989, Ser. No. 336,744

Claims priority, application Finland, May 6, 1988, 882120

Int. Cl.[5] B60N 1/12; B60R 21/06, 22/10

U.S. Cl. 280—749 9 Claims

1. A safety installation for carrying children in a vehicle, which safety installation comprises:

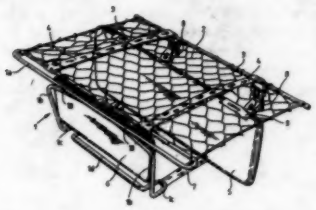
a framework to be detachable fastened to seat of the vehicle,

a net structure connected at its first end to the framework,

an edge portion arranged at a second end of the net structure and connected to said nét structure, opposite to the framework,

at least one connecting element for connecting the the edge portion to the framework,

wherein the framework is a framing, an upper edge of which forms an oblong loop on a plane essentially perpendicular to a plane of side edges of the framing, whereby the side edges in the vicinity of the upper edge, from the middle



thereof, run essentially symmetrically outwards and thereafter make a sharp turn essentially symmetrically from the upper edge downwards and are joined through a lower edge of the framing, and that

the upper edge of the framing is joined to the edge portion through at least one first shock absorbing element running parallel with the net structure.

4,955,637

ANCHORING OF END POINTS OF SAFETY BELTS

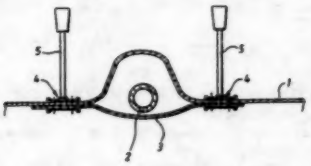
Guntram Huber, Aidlingen, and Walter Jahn, Ehningen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Suttgart, Fed. Rep. of Germany

Filed Sep. 8, 1989, Ser. No. 404,412

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1988, 3831199

Int. Cl.[5] G60R *22/22*

U.S. Cl. 280—801 **3 Claims**



1. Anchoring arrangement for end points of safety belts or safety belt buckle attachments for rear seats of motor vehicles with rear-wheel drive, in the vehicle floor region, wherein the end points, together with a bridge passing under a drive shaft at a close distance, are fixed to the vehicle floor on both sides of the drive shaft so that when the end points are greatly stressed the drive shaft is also used for load bearing.

4,955,638

DECELERATION SENSOR HAVING SAFETY CATCH MEANS

Yoshihiko Kinoshita; Hirashi Tabata; and Mitsuru Gota, all of Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,782

Claims priority, application Japan, Sep. 29, 1987, 62-244873; Sep. 29, 1987, 62-244874; Sep. 29, 1987, 62-244875; Sep. 29, 1987, 62-148690[U]

Int. Cl.[5] B62R *22/36*

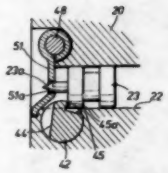
U.S. Cl. 280—806 **9 Claims**

1. A deceleration sensor for releasing energy stored in energy storage means upon detection of an acceleration or deceleration in excess of a certain threshold level, comprising:

a firing pin urged by first spring means in a direction to thereby cause said energy storage means to release its energy;

a sensor mass which is urged by second spring means to a neutral state and guided to be moved against the spring force of said second spring means under its own inertial force upon detection of an acceleration or deceleration in excess of said threshold level;

trigger means cooperating with said sensor mass for retaining said firing pin to its dormant state when said sensor



mass is at said neutral state and releasing said firing pin when said sensor mass is moved under its own inertial force; and

safety catch means which includes stopper means for directly restraining a front end portion and a body portion of said firing pin and for directly preventing the propulsion of said firing pin under the spring force of said first spring means, said stopper means being adapted to be manually moved in a single stroke between a first position for substantially releasing said portions of said firing pin being restrained and for allowing the propulsion of said firing pin, and a second position for preventing the propulsion of said firing pin.

4,955,639

STRUCTURE FOR MOUNTING A SLIP JOINT

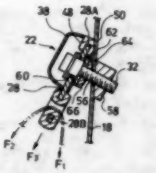
Toshimasa Yamamoto, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Nov. 25, 1988, Ser. No. 276,132

Claims priority, application Japan, Nov. 27, 1987, 62-180637[U]

Int. Cl.[5] B60R *22/18*

U.S. Cl. 280—808 **7 Claims**



1. A structure for pivotally mounting a slip joint on a vehicle body, comprising:

a support member attached to said vehicle body; and

a slip joint, said slip joint having a suspending portion for suspending a webbing movably along a length of said webbing to restrain an occupant of the vehicle, and a pivotal portion whereby said slip joint is pivotally supported by said support member through said pivotal support portion thereof so that an extension line of a resultant force acting on said suspending portion, of a webbing takeup force from a takeup means acting on said webbing from a first side of the suspending portion and a webbing

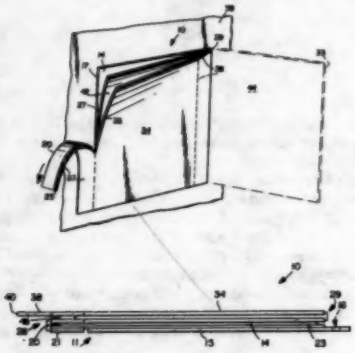
extension force acting on said webbing from a second side of the suspending portion to extend the webbing from the takeup means, passes through said pivotal support portion and crosses a longitudinal axis of said pivotal support portion substantially at right angles, said slip joint having an inclined surface formed in the vicinity of said pivotal support portion, for contact with the support member.

4,955,640

Z-FOLDED PACKING LIST/INVOICE

Michael W. Anderson, Erie, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,642
Int. Cl.[5] B42D *1/00*
U.S. Cl. 281—2 **14 Claims**



1. A business form suitable for use as a packing list or invoice attached to a package, and having a portion thereof serving as a shipping label to which variable address information may be applied, comprising:

a label stock portion having first and second side edges and first and second major faces;

a bond paper portion having first and second side edges and first and second major faces;

the second edge of said label stock portion being overlapped with the second edge of the bond paper portion and fixed together at the overlapped portion;

means defining tractor holes adjacent said label stock portion first edge and adjacent said bond stock portion first edge, for facilitating feeding of said form through printers; and

said second face of said label stock essentially completely covered by adhesive.

4,955,641

PIPE SEALS USED IN UNDERGROUND SEALED DISTRIBUTION SYSTEMS

Larry G. Dent, 3312 West Side Hwy., Castlerock, Wash. 98611

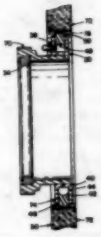
Filed Feb. 27, 1989, Ser. No. 315,517
Int. Cl.[5] F16L *17/00*
U.S. Cl. 285—96 **2 Claims**

1. A manhole adapter assembly to seal a pipe about the exterior of an inserted end thereof to the interior of an opening in the side of a manhole, comprising:

(a) a cylindrical rigid sleeve,

having one end of uniform thickness insertable into the opening in the side of said manhole, while leaving a surrounding clearance to receive a sealing subassembly, and having the other end extending out from the side of said manhole, while providing at this other extending end an internal circular recess to receive an interior circular seal;

(b) said sealing subassembly to be secured firmly about the exterior of the one end having a uniform thickness of the cylindrical rigid sleeve, wherein this sealing subassembly comprises: a circular positioner having a channel crosssectional shape opening inwardly toward the side of said manhole, having a channel-base interior diameter sized to fit securely about the exterior of the one end of uniform thickness of this cylindrical rigid sleeve, and having the channel interior cross-sectional shape sized to fully receive a circumferential seal of a resilient sealing material, and having a valve fitting to receive a liquid and distribute the liquid about the interior of the channel interior cross-



sectional shape, having said circumferential seal of said resilient sealing material fitted within the channel interior cross-sectional shape of the circular positioner, and having the liquid for passing through the valve fitting and being distributed around the channel interior cross-sectional shaped and expanded to radially move the circumferential seal to bear against the manhole about the opening in the side of said manhole; and

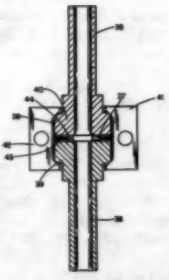
(c) said interior circular seal of resilient sealing material partially fitted into the interior circular recess at the other extending end of the cylindrical rigid sleeve and extending radially out of the interior circular recess a sufficient radial distance to firmly seal around an inserted end of said pipe.

4,955,642

PIPE CONNECTOR, IN PARTICULAR FOR GASES

Joseph Dugast, Rouvres, France, assignor to C.G.M.I. Composants Gaz Pour La Microelectronique Internationale, Pontchartrain, France

Filed Apr. 3, 1989, Ser. No. 332,747
Claims priority, application France, Apr. 8, 1988, 88 04721
Int. Cl.[5] F16L *35/00*
U.S. Cl. 285—93 **4 Claims**



1. In a coupling system for pipes which comprises two tubu-

lar end pieces, said end pieces having an axis and end faces and each end piece having a coupling extremity terminating in a plane section perpendicular to said axis of said end pieces, said extremity having a shape and a seal located between said coupling extremities, means for connecting the two end pieces, said means being constituted by two half-shells adapted to be rigidly fixed together so as to produce a longitudinal locking action on said two end pieces, each half-shell having an internal chamfered portion which cooperates with the shape of the coupling extremity of each end piece whereby said half-shell is centered on the axis while at the same time a longitudinal clamping force is applied on the end pieces along the axis, the improvement wherein said seal has an outer annular portion of small thickness and an inner annular portion close to the internal diameter having a greater thickness than the outer annular portion, and an annular sleeve independent of said seal and engaging said extremities for holding said coupling extremities in line with each other, said annular sleeve having a circumferential opening which allows said sleeve to elastically expand and contract to engage said extremities whereby said annular sleeve ensures radial positioning of the seal between the end faces of the end pieces when said coupling extremities are connected one to each other.

4,955,643

CONNECTION FOR FLUIDS

Alfredo D. Bona, Abbiategrasso, and Attilio Airaghi, Cornaredo, both of Italy, assignors to Murray Europe S.P.A., Milano, Italy

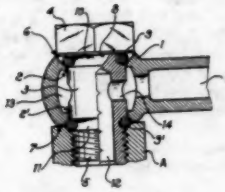
Filed Oct. 26, 1988, Ser. No. 262,999

Claims priority, application Italy, Dec. 10, 1987, 22937 A/87

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.[5] F16L *41/00*

U.S. Cl. 285—190 **5 Claims**



1. A fluid connector for a conduit (A) having a threaded opening and a surface at one end; comprising:

(a) mobile joint (1) having opposite parallel faces (6,7), said joint being provided with an internal chamber (13), a lateral tubular duct (15) fixed to the joint and communicating with said chamber, two coaxial and opposite through-holes (2) and (2') having an inner surface of conical shape, the axis of said through-holes being substantially perpendicular to the axis of the tubular duct (15), said through-holes being formed on said opposite faces of said joint;

(b) a clamping screw having a head (4) with a lower face (8) and threaded portion (5) for coacting with said threaded opening, said screw having a shank (3), said shank being inserted in said through-holes (2) and (2') of the joint (1), said shank (3) being provided with a central duct (12) which is coaxial with said axis of said through-holes and communicating with said chamber (13) by means of at least one transversal hole (14) and two round parallel grooves (10) and (11), one groove (10) being formed in the proximity of said lower face (8) of said head (4), the other groove (11) being formed in the proximity of said threaded portion of said screw;

(c) flexible round seal gaskets (9) and (9') inserted in said round grooves (10) and (11) of the clamping screw and the gasket (9) being placed between said lower face (8) and the conical surface of one of said holes (2), the gasket (9') is placed between the conical surface of the other hole (2') and said surface at said one end of the conduit (A) to be coupled by threaded engagement with said clamping screw.

4,955,644

DRILL PIPE COUPLING

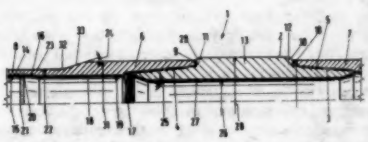
Gerd Pfeiffer, Mülheim; Erich Quadflieg, Krefeld; Friedrich Lenze, Ratingen; Krug, Gerhard, Duisburg, and Josef Siekmeyer, Ratingen, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Jul. 27, 1989, Ser. No. 386,786

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825995

Int. Cl.[5] F16L *25/00*

U.S. Cl. 285—333 **9 Claims**



1. A drill pipe coupling comprising: a coupling member (2) comprising an unthreaded central section (13) having a cylindrical bore (26) therein and an outer portion having outer shoulders (11, 12) on each side thereof; and

adjoining said shoulders axially extending respective conical external threads (3, 4);

a drill pipe comprising an undeformed cylindrical bore (14) and connected thereto an internal correspondingly threaded upset head section formed as a bell element having end surfaces (9, 10), said drill pipe end surfaces (9, 10) sealingly abutting said outer shoulders (11, 12) of said central section (13) when joined together;

said drill pipe further comprising an intermediate section (16) adjoining said cylindrical bore (14) and having an inside diameter which decreases in the direction toward said threaded section (5, 6);

a cylindrical bore section (18) adjacent said intermediate section (16) extending to said threaded section (5, 6);

a rounded transition between said cylindrical bore (14) of said undeformed pipe (8) and said intermediate section (16);

an outside shoulder (33) opposite said cylindrical bore section (18), the outside diameter of said pipe in the upset region (23) of said shoulder (33) being at least equal to the outside diameter (21) of said undeformed pipe (8) and the length of said region (23) being greater than the length of said intermediate section (16);

said external threads (3, 4) being radially inwardly thickened and having at the ends thereof a bevelled section pointing towards the inside of said coupling member (2); and

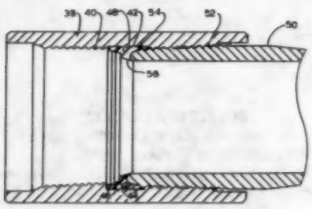
the outside diameter (28) of said central section (13) of said coupling member (2) being greater than the diameter (31) of said bell elements abutting said shoulders (11, 12) of said coupling member (2).

4,955,645

GAUGING DEVICE AND METHOD FOR COUPLING THREADED, TUBULAR ARTICLES AND A COUPLING ASSEMBLY

Craig C. Weems, Houston, Tex., assignor to Tuboscope, Inc., Houston, Tex.

Division of Ser. No. 97,183, Sep. 16, 1987. This application Dec. 6, 1988, Ser. No. 280,587
Int. Cl.[5] F16L *17/00*
U.S. Cl. 285—355 **7 Claims**



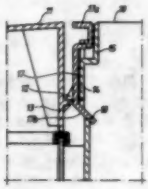
1. A coupling assembly comprising an annular coupling having internal threads adapted for threaded engagement with external threads of a tube inserted into said coupling, said coupling having an annular gasket of deformable material at an interior portion of said coupling intermediate the ends thereof, said gasket having a minimum diameter prior to deformation greater than the internal diameter of the inserted tube, said gasket having a radially inwardly extended portion thereof deformed by an end of said tube inserted into said coupling and having an integral extended portion for engaging and being deformed by said external threads of said tube inserted into said coupling, and engaging means, including a continuous, annular flange having a diameter less than the minimum diameter of said internal threads that projects radially inwardly from said interior portion of said coupling and into a mating, annular notch in said radially inwardly extended portion of said gasket for engaging said gasket to fixedly connect the same to said coupling, whereby longitudinal movement of the gasket relative to the coupling is restrained.

4,955,646

LOCKING DEVICE, ESPECIALLY FOR A COVER OF A SUCTION CLEANER

Jan T. Jankevics, Vällingby, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Aug. 18, 1989, Ser. No. 395,905
Claims priority, application Sweden, Sep. 8, 1988, 8803164
Int. Cl.[5] E05C *19/06*
U.S. Cl. 292—85 **2 Claims**



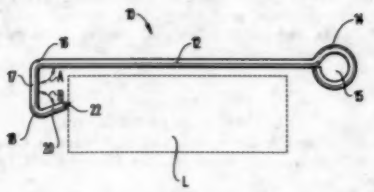
1. In a locking device for a cover having at least one movable latch (12) adapted to releasably engage a corresponding step (13) on the cover (11), the improvement wherein the latch (12) is provided at a free end of a leaf spring (14) attached to a stationary portion of the locking device, a control means (17) being provided adjacent to said leaf spring and movable parallel to the leaf spring, said control means having a push button (17*a*) at one end above said latch, and an oblique guide surface (17*b*) at its other end, said guide surface engaging a corresponding inclined stationary supporting surface of the locking device below said latch and, when said control means is displaced axially due to actuation of said push button, providing a lateral movement of the control means which actuates said leaf spring to release the engagement of said latch with said step.

4,955,647

LOG HANDLING TOOL

Henry Alfredson, 5-34th St., Stony Brook, N.Y. 11790

Filed Aug. 21, 1989, Ser. No. 396,063
Int. Cl.[5] A47J *49/00*; B65G *7/12*
U.S. Cl. 294—14 **1 Claim**



1. A log handling tool for manipulating logs in fireplaces and wood stoves, comprising:

an elongated metal rod;

a handle portion formed by an arcuate loop bend at an end of said rod;

a first straight leg formed by a 90 degree bend at an end of said rod opposite said handle;

a straight shank portion of said rod extending between said handle portion and said first leg;

a second straight leg formed by a bend in an end portion of said first leg, said second leg forming an included angle between 60 and 75 degrees with said first leg and extending toward said shank portion;

a pointed tip formed on a free end of said second leg; and

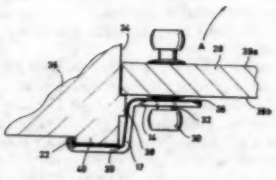
said rod, said handle, said first leg and said second leg all lying in a common plane.

4,955,648

DOOR SECURITY APPARATUS

Harmon R. Miller, 16631 Cromarty Ct., Houston, Tex. 77084

Filed Jun. 7, 1989, Ser. No. 362,574
Int. Cl.[5] E05C *19/18*
U.S. Cl. 292—258 **10 Claims**



1. A security apparatus for preventing opening of a hinged door from the inward swinging side, said door being received in a door frame having a door facing on the outward swinging side of said door frame, said door including a door knob extending from the outward swinging side, said door knob having a shaft portion, comprising:

a web portion having first and second, spaced ends;

a first flange portion depending in a first direction from said first end of said web portion and generally transversely thereto;

a second flange portion depending in a second direction from a second end of said web portion and generally transversely thereto, said second direction being substantially opposite to said first direction, said second flange portion having an inner surface, said inner surface facing in a direction toward an imaginery plane passing through said first flange portion transversely to said web portion;

a lip portion depending from the end of said second flange portion distal said web portion, said lip portion extending in substantially the same direction as said web portion to thereby form a channel defined by said lip portion, said web portion and said second flange portion;

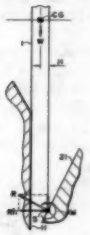
engagement means on said first flange for selectively releasably engaging at least a portion of said door knob and selectively preventing substantial movement of said door knob away from said first flange whereby, when said door is closed and said engagement means engages said door knob on said outward swinging side, said door facing on said outward swinging side of said door frame is received in said channel, whereby pivoting of said apparatus relative to said shaft is restrained sufficiently to maintain said apparatus properly positioned with respect to said door and said door frame.

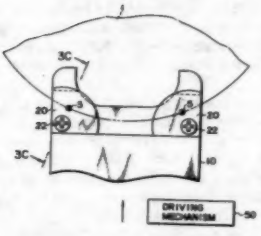
4,955,649

APPARATUS FOR HOLDING PLATES

Katsumi Ishii, Fujino, and Yasushi Sasaki, Atsugi, both of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

Filed Feb. 21, 1989, Ser. No. 312,603
Claims priority, application Japan, Feb. 29, 1988, 63-46482
Int. Cl.[5] A47F *13/06*
U.S. Cl. 294—1.1 **5 Claims**





1. A holding apparatus for a plate-like member comprising:

first holding means having a flat surface; and

second holding means having an inclined surface which is spaced apart from said flat surface by a predetermined distance and cooperates with said flat surface to receive one end portion of the plate-like member, said inclined surface being inclined such that a distance between said inclined surface and said flat surface is deceased in a plate insertion direction, thereby clamping said one end portion of the plate between said inclined surface and said flat surface to hold the plate-like member along said flat surface; wherein said inclined surface of said second holding means has a pair of reaction points which are brought into contact with edge portions of the plate-like member and spaced apart from each other by a predetermined interval in a direction perpendicular to the plate insertion direction.

4,955,650

CANNING RACK HANDLE

Dan E. Davey, E10424 5th St., Spokane, Wash. 99206

Filed Feb. 23, 1989, Ser. No. 314,080
Int. Cl.[5] A47J *45/10*
U.S. Cl. 294—26 **3 Claims**

1. A hand hook comprising:

an elongate handle;

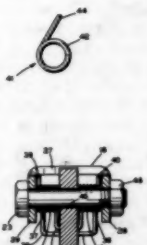
a pair of shafts extending from a point between the ends of the handle at angles other than ninety degrees to form three grips for a user's fingers; and a hook defined at the distal end of each shaft.

4,955,651

HOOK LATCH ADAPTER

Donald E. Barber, Marathon, N.Y., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Dec. 11, 1989, Ser. No. 450,577
Int. Cl.[5] B66C *1/36*
U.S. Cl. 294—82.19 **5 Claims**



1. For a hook having a throat and a flange adjacent said throat, said flange having a predetermined thickness and a hole therethrough for mounting a latch, a latch having two sides, said sides having aligned holes and having a predetermined spacing greater than said predetermined thickness, a latch

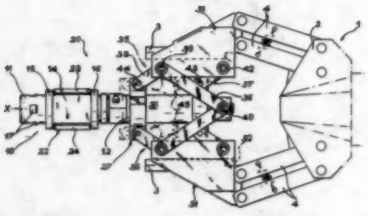
return spring, and fastening means extending through said side holes and said flange hole for securing said latch and said return spring on said flange with said latch sides located on opposite sides of said flange, a hook latch adapter comprising first and second spacers, said spacers defining holes for passing said fastener means, and a generally U-shaped wire loop connecting said spacers together with said spacer holes aligned and said spacers axially spaced apart by substantially the predetermined thickness, said spacers when positioned on opposite sides of a hook flange with said spacer holes aligned with the flange hole having a maximum axial dimension no greater than the predetermined latch side spacing.

4,955,652

GRIPPING TOOL FOR A CABLE CONNECTOR PLUG FOR REMOTE MANIPULATION

Robert Brugere, Sauzet; Robert Faure, Pierrelatte; Yves Galmard, Orange, and Jacques Gerenton, Bourg Saint Andeol, all of France, assignors to Commissariat A L'Energie Atomique, Paris, France

Filed Oct. 26, 1988, Ser. No. 262,620
Claims priority, application France, Oct. 27, 1987, 87 14836
Int. Cl.[5] B25B *5/14*
U.S. Cl. 294—106 **13 Claims**



1. A gripping tool for gripping a movable part such as a cable connector plug having a surface (14), a bearing surface (12), a longitudinal axis (X), and a shoulder (16) transverse to said axis; said tool being of the type actuatable by a romote handling device that includes jaws (3) movable toward and away from each other, said tool comprising:

a support body (21) having a longitudinal extent;

a fork (22, 22') dimensioned to overlap said surface on opposite sides of said longitudinal axis and having a gripping portion contactable in use with said transverse shoulder of said movable part;

a stop piece (27, 27') having a portion contactable with said bearing surface;

said fork and said stop piece mounted on said support body for reciprocal movement toward and away from each other parallel to said axis;

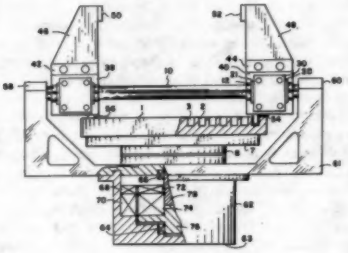
clamp means (31) having laterally spaced apart portions for receiving said support body therebetween, said clamp means being contactable by and movable toward each other from an open unclamped position to a clamped position by said jaws of said remote handling device during use; and motion transmitting mechanisms (35, 49, 65) connected between said clamp means, said body and said stop piece, to cause said stop piece and fork to move along said longitudinal extent of said support body toward each other, in response to said clamp means being moved to said clamped position during use, to cause said fork gripping portion to abut against said transverse shoulder and apply a compressive clamping force thereto parallel to said longitudinal axis of said movable part to enable said tool to grip and tightly hold said movable part between said fork gripping portion and said stop piece for multidirectional maneuvering.

4,955,653

SPIRAL LEAD PLATEN ROBOTIC END EFFECTOR

Beals, David C., Poquoson, Va., assignor to Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 28, 1988, Ser. No. 250,662
Int. Cl.[5] B25J *15/08*
U.S. Cl. 294—119.1 **1 Claim**



1. A Robotic End Effector for manipulating an object comprising:

a platen in the shape of a disc with a flat upper surface and a flat lower surface and an axis of rotation perpendicular to said upper surface, said upper surface having two spiral leads in the form of a groove formed into said upper surface,

said two spiral leads having walls perpendicular to the upper surface of the platen,

said two spiral leads being concentric about the axis of rotation, said two spiral leads originating at points on opposite sides and equidistant from said axis of rotation,

said two spiral leads diverging from said axis of rotation at substantially equal constant linear rates;

means for rotating the platen about the axis of rotation, said means comprising:

an electric motor adapted for repeated rotation to a predetermined position, and

a gear drive mounted on the lower surface of the platen for transferring rotational force from the motor to the platen and for modifying the rate of rotation of the platen relative to that of the motor;

first and second substantially similar moveable grippers, each of having a base and grasping means and each acting against each other to grasp the object being manipulated,

each of said first and second moveable grippers being constrained to move in opposition to each other along a straight track,

said straight track being located so as to form an intersection between the axis of rotation of the platen and to extend for an equal distance on both sides of said intersection,

said straight track being parallel to the upper surface of the platen,

said straight track being formed by a pair of parallel rails to which each of the first and second moveable grippers are attached by means of precision linear bearings;

a means of engaging each of the first and second moveable grippers with a corresponding one of the two spiral leads in the platen, said means of engaging each of the first and second movable grippers comprising:

a bearing fitted to the base of each moveable gripper, and

a round pin fitted to each bearing such that the pin is free to rotate, and

the pin protrudes from the base of a moveable gripper and extends into the corresponding spiral lead,

the pin bears against one perpendicular wall of the corresponding spiral lead, and

a minimum clearance exists between the perpendicular wall

of the corresponding spiral lead against which the pin does not bear, and the pin; and

positioning means for positioning the platen, the means for rotating the platen, the first moveable gripper, the means for engaging the first moveable gripper, and a member against which the first moveable gripper acts to apply grasping force to said object being manipulated, such positioning means including a mounting surface for attaching the robotic end effector to the means for rotating the platen.

4,955,654

END EFFECTOR

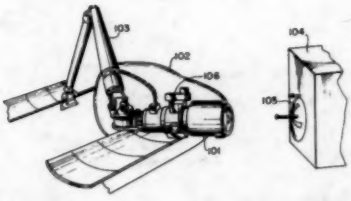
Akira Tsuchihashi, Nagareyama; Naoki Noguchi, Yokohama, and Kesatoshi Kuraoka, Matsudo, all of Japan, assignors to National Space Development Agency of Japan, Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,866

Claims priority, application Japan, Dec. 21, 1987, 62-321298

Int. Cl.[5] B44G *4/00*; B66C *1/12*

U.S. Cl. 294—86.4 **11 Claims**



1. An end effector secured to a front end of a manipulator arm in a remote control system for clamping an object, comprising:

capturing means for capturing said object, said capturing means including a centralizing means for guiding said object to a center of said capturing means, said centralizing means guiding said object through movement in at least three directions, and means for pulling said object into said capturing means once said object has been guided to said center of capturing means;

driving means for generating power for driving said centralizing means;

transmission means for transmitting said driving power generated by said driving means to said centralizing means;

means for detecting at least one of a force and a torque applied to said centralizing means, said detecting means having at least three strain gauges provided respectively at three different positions on said centralizing means and a receiving/transmitting means for receiving signals indicative of at least one of said force and torque from said at least three strain gauges and for transmitting detection signals indicative of at least one of said force and torque being applied to said centralizing means; and

means for controlling an output from said driving means, wherein said control means is continuously responsive to said detection signals so as to continuously control said output from said driving means, thereby restraining a force of said centralizing means acting upon said object.

4,955,655

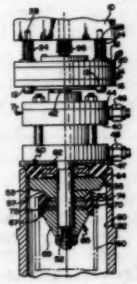
ROBOTIC END-OF-ARM TOOLING MULTIPLE WORKPIECE INTERNAL GRIPPER

Anthony Caracciolo, Jr., Troy; Wayne R. Austin, Warren; Dante C. Zuccaro, Allenton, and Leonard P. Pomrehn, Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1988, Ser. No. 227,022

Int. Cl.[5] B25J *15/00*; B66C *1/56*

U.S. Cl. 294—93 **2 Claims**



2. A robot or like end-of-arm tool (EAOT) for gripping workpieces by cavities in said workpieces, said EOAT in combination comprising:

means for connecting said EOAT with said robot or like;

rod means having a generally flanged end opposite said robot being extendible with respect to said connecting means;

at least one spacer encircling said rod means between said connecting means and said flanged end of said rod; and

at least two elastomeric gripper portions encircling said rod means and capturing at least one spacer, said gripper portions having a first dimension when said rod means is extended whereby said gripper portions can be inserted into one of said workpieces' cavities and said gripper portions having a second dimension when said rod means is retracted whereby said gripper portions can engage with one of said workpieces' cavity to grip said workpiece and a section of one of said gripper portions facing said spacer is annular shaped and said spacer has a tapered end with a diameter smaller than an inside diameter of said gripper section.

4,955,656

GRIPPING DEVICE FOR NAPPY MATERIALS

Johan Krogstrup, Kibaek; Henning Nohr, Kolding; Bruno Christensen, Egtved, and Frank Fosnaes, Kolding, all of Denmark, assignors to Tex-Matic ApS, Kibaek, Denmark

Filed Apr. 17, 1989, Ser. No. 339,146

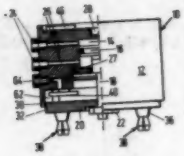
Claims priority, application Denmark, Apr. 19, 1988, 2115/88; Dec. 15, 1988, 6959/88

Int. Cl.[5] B65H *3/22, 3/48*

U.S. Cl. 294—100 **5 Claims**

1. Gripping device for nappy work-pieces comprising a base part, one or more gripping means, and a part slidable relative to the base part and provided with a squeeze means for each gripping means, the gripping means being shaped as elongate bodies which in an area close to their first ends adapted for contact with work-pieces are surrounded by the squeeze means and having slots along a longitudinal axis and at their second ends are fixed against translatory movements in a longitudinal direction relative to the base part and where the gripping means are squeezed by the movement of the slidable part towards the work-piece, characterized in that between the base part and the slidable part there is provided a substantially

closed hollow to which pressurized gas may be supplied through the base part and that the slots, the squeeze means and the slidable part are shaped and relatively arranged in such a manner that the pressurized gas in the hollow is discharged mainly through the section of the slots closest to the hollow to leave the slots by the first ends of the gripping means.



4,955,657

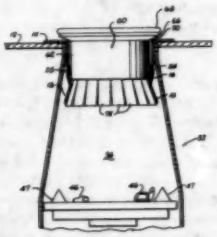
APPARATUS FOR REMOVAL OF FOREIGN MATERIAL FROM SINK DISPOSAL UNITS

John L. Ward, 1006 Barnwell St., Columbia, S.C. 29201

Continuation-in-part of Ser. No. 324,176, Mar. 16, 1989, Pat. No. 4,911,492. This application Feb. 26, 1990, Ser. No. 485,146

Int. Cl.[5] B25B *7/00*; F21V *33/00*

U.S. Cl. 294—118 **20 Claims**



1. A device to aid in removal of foreign matter from a sink garbage disposal unit of the type having an interior refuse hopper and an elastomeric guard means adjacent an opening to such hopper, said device including an outer cylindrical member and an inner cylindrical member slidably retained and movable within said outer member for insertion into the hopper opening as a unit, with said inner member including means at one end thereof for providing access to the hopper by deflecting said elastomeric guard means so as to clear a pathway to such hopper, said inner member also defining an interior passageway therethrough which permits communication with such hopper, whereby improved access to and visibility of the hopper are provided so that foreign matter may readily be grasped and removed therefrom through said inner member passageway.

4,955,658

AUTOMOBILE FOOT REST

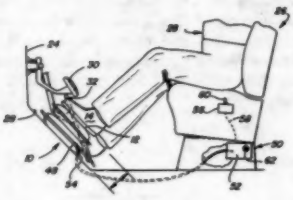
Lee K. Graves, Bloomfield Hills, Mich., assignor to Wickes Manufacturing Company, Southfield, Mich.

Filed Aug. 28, 1989, Ser. No. 399,148

Int. Cl.[5] B60N *3/06*

U.S. Cl. 296—75 **15 Claims**

1. An adjustable foot rest for an occupant of an automobile which has a floor board, comprising an inflatable chamber mounted on the floor board, a foot pad mounted on the chamber for engagement by a passenger's foot, and means for variably inflating the chamber to selectively position the foot pad relative to the floor board.



4,955,659

VEHICULAR BACK DOOR FITTING MECHANISM

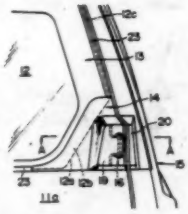
Toshio Kosugi, Hamakita, Japan, assignor to Suzuki Motor Company Ltd., Shizuoka, Japan

Filed Mar. 29, 1989, Ser. No. 330,126

Claims priority, application Japan, May 13, 1988, 63-116072

Int. Cl.[5] B60J *1/18*

U.S. Cl. 296—146 **2 Claims**



1. A vehicular back door arrangement, for fitting a back door to a vehicle rear pillar, comprising: a rear window glass positioned in a rear window glass opening of said back door, said rear window glass having a lower corner cut away slantwise, said rear window glass opening having a slanted lower corner corresponding to said window glass cutaway slantwise lower corner, said slanted lower corner of said back door window glass opening defining a hinge connection location, said hinge connection location being positioned adjacent said window glass cutaway corner; a top door hinge having a first hinge part connected to said hinge connection location of said back door and having a second hinge part connected to said vehicle rear pillar; and at least one lower hinge having a lower hinge first part connected to said back door at a lower hinge location, below said hinge connection location, and having a lower hinge second part connected to said vehicle rear pillar.

4,955,660

TEST STRUCTURE FOR PICKUP TRUCK

Viola A. Leonard, 301 W. Hancock, O'Neill, Nebr. 68763

Filed Sep. 18, 1989, Ser. No. 408,694

Int. Cl.[5] B60P *7/04*

U.S. Cl. 296—165 **2 Claims**

1. In combination with a pickup truck that includes a cargo box defined by two upstanding side walls, a front wall, and a tailgate, each side wall having stake reception sockets therein near the front and rear ends thereof; the tailgate and each said wall having an upper edge:

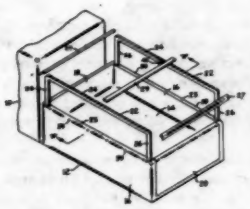
the improvement comprising flexible tent means installable

on the cargo box to provide a temporary cover; said tent means including a retractable frame structure supported on the box side walls, and a flexible cover arranged to fit over said frame structure when said structure is pulled upwardly from a retracted position;

said frame structure comprising a sleeve insertable into each stake socket to form a vertical guide, two similarly constructed side frame elements, and two detachable transverse bars adapted to interconnect said frame elements at their front and rear ends;

each side frame element being a U-shaped member that includes a horizontal rail and downwardly-extending legs at each end of said rail;

each U-shaped member having its downwardly extending legs slidably positioned in two of the guide sleeves at the front and rear ends of a box side wall, whereby each respective horizontal rail will have a retracted position extending along the upper edge of the cargo box side wall and a raised position spaced above the upper edge of the



box side wall; said transverse bars being attachable to the frame elements so as to span the zones above the box front wall and tailgate, respectively, when the side frame elements are in their raised positions;

said flexible cover comprising a central rectangular top panel having four edges and a rectangular side panel (**50, 52, 54, 56**) hingedly connected to each edge of said central panel being adapted to assume a centralized position over the frame structure, with the four side panels hanging downwardly along the frame structure when the frame structure is in its raised position;

and a manually-actuable latch means located within each side frame element for releasably retaining each said frame element in its raised position; each said latch means comprising a movable latch element mounted in each leg of the associated frame element, and a manual actuator mounted in the associated horizontal rail; each said actuator being operably connected to both associated latch elements, whereby a manual operating force on a given actuator operates both associated latch elements.

4,955,661

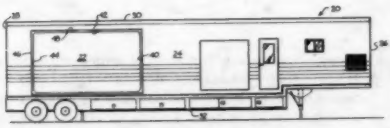
ENVIRONMENTALLY PROTECTED EXPANDABLE TRAILER

Richard E. Mattice, Oneonta, N.Y., assignor to Medical Coaches, Incorporated, Oneonta, N.Y.

Filed Apr. 20, 1989, Ser. No. 340,695

Int. Cl.[5] B62D *39/00*

U.S. Cl. 296—171 **10 Claims**



1. A transportable enclosure, comprising:

a transportable enclosure body including:

a side having at least one opening at a predetermined location;

a parallel side portion connected to the side and extending within the opening;

at least one expandable section having a wall and being slidably engaged within the opening in a predetermined direction, the wall substantially facing the parallel side portion such that the wall and parallel side portion each extend in a plane substantially parallel to the direction of sliding of the expandable section; and

an inflatable seal assembly, attached to one of the parallel side portion or the wall, including an inflatable seal capable of inflating toward and against the other of the parallel side portion or the wall.

4,955,662

VEHICLE BODY STRUCTURE REINFORCED BY COWL MEMBER

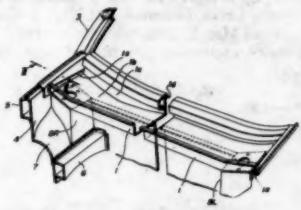
Michio Kudo, Yamato, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Sep. 15, 1988, Ser. No. 244,396

Claims priority, application Japan, Sep. 18, 1987, 62-142694[U]

Int. Cl.[5] B62D *25/08*

U.S. Cl. 296—192 **1 Claim**



1. A body structure for a vehicle comprising:

strut towers constructed and arranged to bear load from suspension units of the vehicle, said strut towers having upper ends, respectively, and

a cowl member, in the form of a channel member having a bottom wall, said bottom wall extending between said strut towers and having end portions thereof secured directly to said strut towers on said upper ends thereof, respectively, thereby resisting inclination of said strut towers towards each other.

4,955,663

FRONT BODY CONSTRUCTION OF A VEHICLE

Yutaka Imura, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 29, 1988, Ser. No. 226,010

Claims priority, application Japan, Aug. 1, 1987, 62-118587[U]

Int. Cl.[5] B62D *27/00*

U.S. Cl. 296—194 **11 Claims**

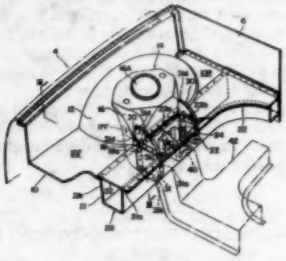
1. A front body construction of a vehicle comprising:

a front wheel apron forming part of a side wall of an engine compartment;

a front side frame in a form of a U-shaped channel member, having an inner side wall, an outer side wall and a bottom wall, extending in a lengthwise direction from a front end to a rear end of said engine compartment and attached to said front wheel apron for supporting said front wheel apron;

a suspension tower attached to said front wheel apron for supporting a front wheel suspension apparatus; and gussets, each including a base section and having an upper

part, said upper part being attached to said suspension tower, said base section having a lower part thereof disposed within said front side frame, said lower part being



attached to at least one of said inner side wall, said outer side wall and said bottom wall of said front side frame so that said lower part of said base section serves as a node member of said front side frame.

4,955,664

VEHICLE, ESPECIALLY A LOADER

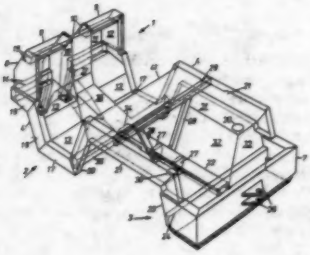
Karl Friedrich, Sipplingen, Fed. Rep. of Germany, assignor to Kramer-Werke Gmbh, Bodensee, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 318,665

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808314

Int. Cl.[5] B62D *21/07*

U.S. Cl. 296—204 **17 Claims**



1. In a vehicle, especially a loader of the type having a loading boom linked to the front and a motor suspended at the rear of the vehicle, comprising a rigid frame including a plurality of longitudinal and transverse frame members, two longitudinal lateral frame members extending at two opposite sides of said frame and having arch portions extending over back wheels of the vehicle and in the area of a middle section of the vehicle running at a level of a vehicle floor adjoining a boarding step, the improvement comprising said two longitudinal lateral frame members each having a front section extending partially over a respective front wheel of the vehicle for supporting a front portion of the vehicle, said frame further including a central longitudinal frame member extending at about the level of the vehicle floor between axles of the wheels and rearwardly as far as a rear end of the vehicle, said central longitudinal frame member being joined to a plurality of transversal frame members and having a bottom on which axle flanges for fastening a rear axle are provided, said frame being additionally stiffened by inclusion of parts of a vehicle superstructure in the area of the rear end, front end and the boarding step of the vehicle.

4,955,665

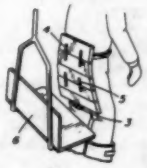
RETRACTABLE SEAT COVER

Steven P. Richer, 417, Third Street E., Cornwall, Ont., Canada

Filed Nov. 21, 1989, Ser. No. 439,806

Int. Cl.[5] A47C *1/00*

U.S. Cl. 297—4 **7 Claims**



1. A seat covering device comprising:

(a) a plurality of pad members each comprising a layer of flexible insulating material;

(b) a cover for encasing said pad members and providing a flexible connection forming a fold area between adjacent pad members permitting adjacent ones of said pad members to be placed in juxtaposition with each other to form a folded article and, when unfolded about said fold area, a lay-flat article having first and second longitudinal ends; and

(c) at least one elastic cord member secured at one end thereof to a pad member at a said first end of said lay flat article and at the other end thereof to a pad member at said second end of said lay flat article; said cord member extending freely through alternate opposed sides of each of said adjacent pad members intermediate the pad members at said first and second ends, whereby said pad members may be extended, against tension in said cord member to form said lay flat article and retract automatically to form said folded article upon release of said tension.

4,955,666

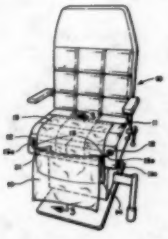
SURGICAL CHAIR OR TABLE WITH DEBRIS-CATCHING FACILITY AND DISPOSABLE CATCH BAG THEREFOR

Jeffrey H. Baker, Sandy, Utah, assignor to M-D, Inc., West Valley City, Utah

Continuation-in-part of Ser. No. 332,333, Apr. 3, 1989, abandoned. This application May 19, 1989, Ser. No. 355,230

Int. Cl.[5] A47D *15/00*

U.S. Cl. 297—182 **20 Claims**



1. A disposable receptacle for use with a medical or surgical chair or table during examination of, or a surgical procedure on, a patient sitting or lying on the chair or table so as to protect the chair or table from soiling or contamination by liquids and debris used in or resulting from the examination or surgical procedure and to collect and retain such liquids and

debris for disposal, comprising a wide bag of disposable, liquid-impervious, flexible sheet material having a relatively narrow receiving opening extending from side-to-side of the bag; a flap of similar sheet material extending from and along one width margins of said opening for covering an adjacent portion of the seat of the chair or the top of the table that is likely to be soiled during said examination or surgical procedure when said bag is positioned at the front of said chair or table in open condition at or below the level of said seat of the chair or top of the table to be held in place under the weight of a patient sitting or lying on said flap; and means extending along another width margin of said opening for bowing outwardly of said opening in the forming of said opening to receive said liquids and debris.

4,955,667

SEATING IN THE FORM OF A CHAIR OR SIMILAR PIECE OF FURNITURE

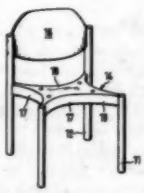
Rolf Brunner, Rheinau-Helmlingen, Fed. Rep. of Germany, assignor to Brunner GmbH, Rheinau-Freistett, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 398,245

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828808

Int. Cl.[5] A47C *1/12*

U.S. Cl. 297—446 **9 Claims**



1. A seating arrangement comprising: a chair with at least three legs and a holding frame; said legs being attached to said holding frame; said holding frame being a support for a seat in vicinity of a seating plane; said holding frame comprising a box-shaped frame having a top plate member and a bottom plate member, spaced from said top plate member; and side members connecting fixedly edges of said top plate member and edges of said bottom plate member to prevent shifting of said top plate member and said bottom plate member relative to each other.

4,955,668

DRUM CUTTER-LOADER EQUIPPED WITH AN AUXILIARY DRUM

Herbert Schupphaus, Bochum, Fed. Rep. of Germany, assignor to Gebr. Eickhoff Maschinenfabrik u. EisenieBerei mbg, Bochum, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,625

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821307

Int. Cl.[5] E21C *25/08, 35/20*

U.S. Cl. 299—42 **9 Claims**

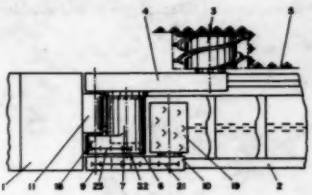
1. A drum cutter-loader mining machine comprising:

a machine body carrying a support arm which rotatably supports a cutting drum, said support arm being pivotally attached to said machine body;

a motor for driving said cutting drum, said motor being connected to said cutting drum by gearing;

a jib carried by said machine body, said jib being pivotally attached to said machine body and rotatably supporting an auxiliary drum;

means for permitting independent pivoting of the support arm and the jib about a common pivot axis; and



gear means arranged coaxially with said common pivot axis for producing a geared communication between the auxiliary drum and the motor for driving the cutting drum.

4,955,669

WHEEL BEARING ARRANGEMENT FOR SUCTION CLEANER

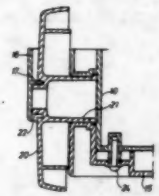
Jan T. Jankevics, Vällingby, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed May 3, 1989, Ser. No. 346,800

Claims priority, application Sweden, May 20, 1988, 8801909

Int. Cl.[5] B60B *19/00*

U.S. Cl. 301—1 **3 Claims**



1. Wheel bearing arrangement for a suction cleaner, in which a wheel (20), having an inside and an outside, has a shaft (21) made integral therewith on its inside, the suction cleaner comprising a first housing portion (10) provided with a first bearing member (11) having a first bearing surface (12) enclosing half the circumference of the shaft, and a second housing portion (15) provided with a second bearing member (13) having a second bearing surface (14) enclosing the remaining half circumference of the shaft, wherein the wheel (20) has a pivot (22) on its outside and that the first housing portion (10) comprises a supporting wall (16) extending along the outside of the wheel and having a third bearing member (17) cooperating with said pivot (22).

4,955,670

SHIELD FOR DETAILING VEHICLE TIRES

William R. Koller, 12235 W. 61st Ave., Arvada, Colo. 80004

Filed Jun. 23, 1989, Ser. No. 370,822

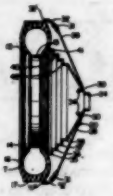
Int. Cl.[5] B60B *7/00*; B05C *21/00*

U.S. Cl. 301—37 R **12 Claims**

1. A motor vehicle detailing shield for releasably covering a vehicle wheel cover having an outer peripheral rim when a detailing solution is to be applied to the sidewall of a vehicle tire seated on the rim portion of said wheel cover, said shield comprising:

a generally bowl-shaped body having an inclined wall terminating in an axially extending outer peripheral edge portion and a plurality of circumferentially extending markings in spaced concentric relation to one another and in

adjacent but spaced relation to said outer peripheral edge portion, said markings describing circumferential lines of separation along said inclined wall for selective removal of circumferential portions of said body disposed radially and outwardly of a selected one of said markings whereby



the diameter of said body will substantially conform to the diameter of said wheel cover; and

securing means associated with said body for releasably positioning said body over said wheel cover when said solution is to be applied to the sidewall.

4,955,671

ANTISKID CONTROL DEVICE

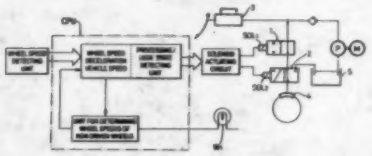
Hideaki Higashimura, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 8, 1989, Ser. No. 310,829

Claims priority, application Japan, Feb. 10, 1988, 63-29745

Int. Cl.[5] B60T *8/10*

U.S. Cl. 303—92 **3 Claims**



1. In an antiskid control device of an automotive vehicle, the antiskid control device having a processing/lock state detecting means for executing logical operations on the basis of wheel speed signal supplied from a wheel speed detecting unit to determine whether the wheels are entering into a locking state and whether the wheels are recovering from a locking state, and for transmitting signals to reduce, hold and increase a breaking pressure on the basis of the thus executed logical operations, the antiskid control device further including solenoid activating means for actuating solenoids for pressure control valves in hydraulic circuits in response to the signals transmitted from the processing/lock state detecting means, the improvement comprising a malfunction detecting means for detecting a malfunction of the wheel speed detecting means, said malfunction detecting means comprising:

means for detecting a first state in which a predetermined one of the driven wheels has reached a predetermined speed;

means for detecting a second state in which a difference in wheel speed between said predetermined driven wheel and all of the non-driven wheels has exceeded a predetermined value during said first state;

count timer means for increasing a count thereof during said second state; and

malfunction indication means for indicating a malfunction of the wheel speed detecting means in response to said count of said count timer exceeding a predetermined value.

4,955,672

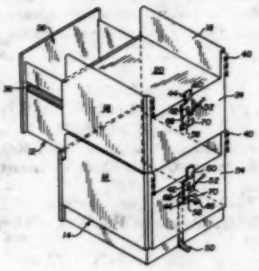
DRAWER INTERLOCK

Dinh-Tuong Pham, Hudsonville, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed May 16, 1989, Ser. No. 352,280

Int. Cl.[5] A47B *87/00*

U.S. Cl. 312—107.5 **19 Claims**



1. In a drawer and cabinet assembly having a cabinet housing means with side walls, a back wall and an open front, upper and lower drawers, the upper and lower drawers, each having at least side walls and a back wall, are each mounted to the cabinet housing means in vertical juxtaposed position for horizontal sliding movement between a retracted position in the cabinet housing means and an extended position partially out of the front of the cabinet housing means, and an interlock assembly to prevent movement of more than one drawer out of the front of the cabinet housing means at one time;

the improvement in said interlock assembly comprising a latch pivotably mounted to the cabinet housing means back wall proximate to the back wall of the upper and lower drawers, said latch having an upstanding catch and a depending catch extending from a central portion in relative vertical juxtaposition;

a first retaining means mounted to the upper drawer and having a side edge in registry with the latch upstanding catch when the upper drawer is closed, said first retaining means further having an indented notch offset laterally of the side edge and rearwardly of the side edge, said offset notch adapted to engage the upstanding catch only when the latch rotates toward the upper retaining means from the side edge engaging orientation and the upper drawer is withdrawn slightly from the cabinet housing means;

a second retaining means mounted to the lower drawer and having a side edge in registry with the latch depending catch when the lower drawer is closed, said second retaining means having an indented notch offset laterally from the side edge of the lower retaining means and rearward of the same, said second retaining means offset notch adapted to engage the depending catch only when the latch rotates toward the lower retaining means from the side edge engaging orientation and the lower drawer is withdrawn slightly from the cabinet housing means;

means biasing the latch into engagement with the side edges of the upper and lower retaining means;

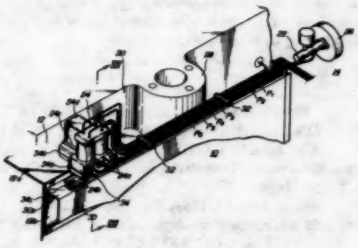
whereby the upper and lower drawers are able to freely move into and out of the cabinet individually but are prevented from moving out of the cabinet in the event that the other of the two drawers has been moved out of the cabinet.

4,955,673

ARRANGEMENT OF ELECTRONIC ANTISKID BRAKE SYSTEM

Mitsunobu Fukuda, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 12, 1988, Ser. No. 143,091
Claims priority, application Japan, Jan. 13, 1987, 62-3435[U]
Int. Cl.[5] B60T 8/32
U.S. Cl. 303—113 10 Claims



1. In a motor vehicle having an engine room, hood ridges between which said engine room is defined, and an electrically controlled antiskid brake system,

an arrangement comprising:

a side member secured to one of said hood ridges and extending along longitudinal axis of said vehicle;

an electric actuator which constitutes part of said antiskid brake system, said actuator being mounted on said side member;

a plurality of brake pipes which constitute part of said antiskid brake system and extend from said electric actuator, said brake pipes running along said side member and secured to the same;

said side member being a generally channel-like member which has an elongate flat track portion on which said electric actuator and said brake pipes are tightly disposed; and

a mounting device through which said electric actuator is connected to said track portion, said mounting device including a first holder portion which receives a first portion of said actuator and a second holder portion which receives a second portion of said actuator.

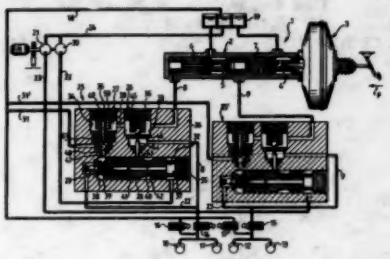
4,955,674

ANTI-LOCKING HYDRAULIC BRAKE SYSTEM

Holger V. Hayn, Bad Vibel, and Juergen Rausch, Eschborn/Ts., both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,484
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832538
Int. Cl.[5] B60T 8/42
U.S. Cl. 303—114 10 Claims

1. An anti-locking hydraulic brake system comprising a master brake cylinder and an associated pressure fluid reservoir, wheel brakes and brake conduits connecting the wheel brakes with the master brake cylinder, a return conduit connecting the wheel brakes with the reservoir, inlet valves inserted into the brake conduits and outlet valves inserted into the return conduit, sensors for detecting the rotational pattern of the wheels and an electronic control unit for evaluating the wheel sensor signals and generating control signals for operating the inlet and outlet valves, at least one pump delivering fluid from the reservoir through pressure conduits into the brake conduits, a check valve arranged so as to be under the control of the pump pressure for interrupting the brake conduit, a control valve for adjusting the pressure in the pressure conduits so that it is proportional to the pressure in the master cylinder, a diaphragm inserted into the pressure conduit and a piston located in the pressure conduit with a chamber on oppo-



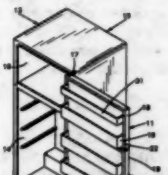
site sides of the piston, the piston cooperating with a closure member associated with the check valve such that the brake conduit is interrupted upon a movement of the piston under the action of the dynamic pressure upstream of the diaphragm.

4,955,675

HINGED PANELS WITH FOAMED-IN-PLACE INSULATION

David J. Donaghy, Gowen, Mich., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Apr. 17, 1989, Ser. No. 339,157
Int. Cl.[5] A47B 81/00
U.S. Cl. 312—214 11 Claims



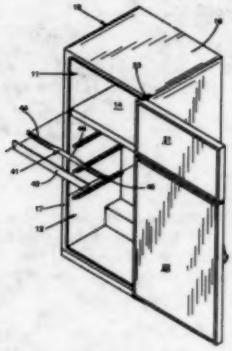
1. An insulated hinge panel for thermal cabinets comprising a polygonal shell having corners and defining at least part of a cavity, hinge bearings mounted in said shell adjacent to said corners, said hinge bearings extending into said cavity and defining a generally cylindrical passage adapted to receive and journal a hinge pin, said cylindrical passage being open at an outer end exterior of said shell and substantially closed at its inner end by an inner end wall, and insulation foamed in place filling said cavity including said corners, said hinge bearings providing at least one vent opening through which gases within said cavity are vented while said insulation is foamed so that said foam substantially fills said corners, said at least one vent opening being sized and shaped to allow gases to vent while preventing said foam insulation from entering said cylindrical passage.

4,955,676

REFRIGERATOR MULLION CONSTRUCTION

Douglas E. Weaver, and Harold S. Mawby, both of Greenville, Mich., assignors to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Aug. 29, 1989, Ser. No. 400,284
Int. Cl.[5] A47B *81/00*
U.S. Cl. 312—214 **12 Claims**



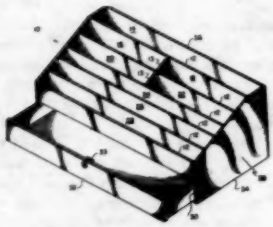
1. A refrigerator cabinet comprising a shell having side walls, a top wall, and a bottom wall, said walls defining an opening and having inturned edges defining a face around said opening, said edges including re-entrant and reversed flanges forming a groove between said flanges behind said face, a liner within said shell defining a chamber and having an outwardly extending flange received within said groove, a horizontal partition within said liner separating the interior of said liner into top and bottom compartments, a mullion cover on the front face of said partition extending between the edges of said side walls, a mullion strap behind said mullion cover having an end portion at each end and a center portion interconnecting said end portions, said center portion being flat and flexible, each of said end portions extending into the adjacent groove, each of said end portions being formed as a channel having an open side adjacent said mullion cover whereby said mullion cover and said mullion strap form a rectangular box at each end.

4,955,677

SAND PAPER ORGANIZER AND DISPLAY RACK

In W. Song, 6038 Santa Monica Blvd., Los Angeles, Calif. 90038

Filed Aug. 1, 1988, Ser. No. 227,061
Int. Cl.[5] A47B *81/00*
U.S. Cl. 312—290 **3 Claims**



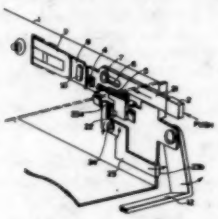
2. A two position cabinet for displaying articles in a vertical position or a horizontal position, a plurality of divider walls dividing the cabinet into a plurality of differently sized article receiving slots so that when the cabinet is in one position the articles will be displayed in a vertical position and when the cabinet is in the other position the articles will be displayed in a horizontal position, said cabinet having at least one pair of identically sized drawer receiving slots, each said drawer receiving slot being defined by a width, length, and depth dimension, the corresponding width, length, and depth dimension of each drawer receiving slot being identical, the slots in each pair transverse to each other and sized to receive a drawer, said drawer receiving slots positioned so that regardless of whether the cabinet is in one position or in a transverse position, one of the drawer receiving slots is along a wall of the cabinet and the other drawer receiving slot is in a horizontal position adapted to receive a drawer.

4,955,678

ENGAGING STRUCTURE FOR A MOUNTABLE/DISMOUNTABLE ELECTRONIC APPARATUS USED IN A VEHICLE

Shigeotshi Kobayashi, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1989, Ser. No. 375,244
Claims priority, application Japan, Jul. 4, 1988, 63-87968
Int. Cl.[5] A47B *88/00*
U.S. Cl. 312—320 **6 Claims**



1. An apparatus comprising: first and second members, said first member being insertable into said second member in a first direction and being removable from said second member in a second direction opposite said first direction; engaging means operable when said first member is in said second member for releasably coupling said first and second members in a manner preventing movement of said first member in said second direction relative to said second member; a carrying handle supported on said first member for movement between retracted and carrying positions; a manually operable releasing part supported on said first member for movement between first and second positions; first means for causing said engaging means to interrupt said releasable coupling of said first and second members in response to movement of said releasing part from its first position to its second position; and second means for moving said carrying handle from its retracted position to its carrying position in response to movement of said releasing part from its first position to its second position.

4,955,679

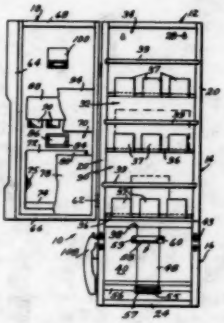
INFORMATION ORGANIZER

Herman F. Russell, P.O. Box 334, La Center, Ky. 42056, and Ray E. Lynn, Rte. 1, Box 218, Wickliffe, Ky. 42087

Filed Oct. 6, 1989, Ser. No. 417,908
Int. Cl.[5] A47B *81/00*
U.S. Cl. 312—321.5 **5 Claims**

1. An organizer comprising a vertically elongate housing with an open front, a mounting panel generally coextensive with said open front of the housing, means for pivotally mounting said mounting panel on said housing for selective movement outward relative to the housing to an open position remote from said open front, said mounting panel having a front face for display of a multiple information-providing

components, and a rear face, said information-providing components including clock means mounted on said panel and displayed on said front face, at least one display pocket, said at least one display pocket comprising a recess formed in the mounting panel through the rear face, said recess being of a depth to receive multiple stacked sheet-like information elements with display faces directed toward the front face of the mounting panel, and an opening through the front face of the



mounting panel generally aligned with said recess for display of a recess-received element, said recess extending laterally beyond said opening inward of said front face of said mounting panel for retention of said elements against unrestricted withdrawal through said opening, a backing panel engaged over the rear of the recess at the rear face of the mounting panel for retention of the elements, and multiple storage components mounted inward of said mounting panel for concealment within said housing.

4,955,680

METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING THE FOCUS OF CATHODE RAY TUBES

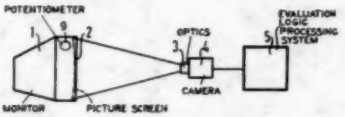
Ruediger Froese-Peeck, and Richard Poleschinski, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 318,830

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809602

Int. Cl.[5] H01J *29/58*

U.S. Cl. 315—382 **6 Claims**



1. A method for the automatic calculation of the image focus of a cathode ray tube which has a cathode beam which scans the screen of said tube with parallel scan lines which extend in a first direction and which has a focussing potentiometer, such as monochromatic and color monitors (1), comprising the steps of producing on the screen of the cathode ray tube (2) an image having an optimal number of black to white transitions, for example forming a fine checkerboard pattern or a fine line pattern, detecting said entire image with a first solid-state camera which includes a pickup tube which is scanned by a beam in parallel scan lines which extend in a second direction which is so mounted that said first direction is at right angles to said second direction and wherein said camera records with at least double resolution, acquiring with an image processing system (5) the fine point structure of the image with full resolution, calculating the image focus on the basis of a histogram calculation, and adjusting said focussing potentiometer in the deflection assembly of said cathode ray tube using the data from the histogram curve.

4,955,681

IMAGE DISPLAY APPARATUS HAVING SHEET LIKE VERTICAL AND HORIZONTAL DEFLECTION ELECTRODES

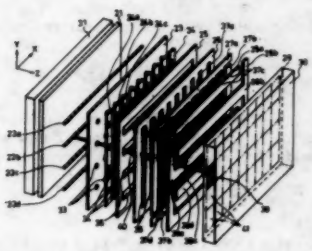
Toshinobu Sekihara, Osaka; Mitsunori Yokomakura, Takatsuki; Yuichi Moriyama, Ibaraki; Michiaki Watanabe, Ibaraki; Tomohiro Sekiguchi, Ibaraki; Keiji Nagata, Hirakata, and Takatsuga Kurata, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 16, 1988, Ser. No. 271,821

Claims priority, application Japan, Nov. 16, 1987, 62-288762; Jul. 25, 1988, 63-184962

Int. Cl.[5] H01J *19/28, 29/74*

U.S. Cl. 313—495 **10 Claims**



1. An image display apparatus comprising:

a plurality of line cathodes which are extended in parallel with each other to emit electrons;

an electron beam extraction electrode for extracting electron beams from said line cathodes;

a control electrode for selectively controlling a passing amount of electron beams having passed through said electron beam extraction electrode;

a first focusing electrode for electrostatically focusing electron beams having passed through said control electrode, said first focusing electode being of a conductive sheet in which a plurality of oblong apertures elongated in an extended direction of said line cathodes are formed;

a second focusing electrode which is disposed adjacent to said first focusing electrode and electrostatically focuses electron beams having passed through said first focusing electrode, said second focusing electrode being of a conductive sheet in which a plurality of oblong apertures elongated in a perpendicular direction to the extended direction of said line cathodes are formed;

a deflection electrode for deflecting electron beams having passed through said second focusing electrode; and

display means for emitting light by receiving electron beams having passed through said deflection electrode thereon.

4,955,682

SCANNING OPTICAL SYSTEM

Katsumi Yamaguchi, Fuchu, and Nobuo Sakuma, Inagi, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,256

Claims priority, application Japan, Aug. 1, 1988, 63-192344

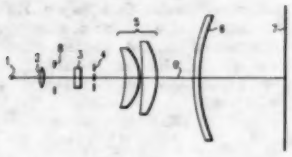
Int. Cl.[5] G02B *26/10, 3/02*

U.S. Cl. 350—6.8 **5 Claims**

1. A scanning optical system for use in a light scanner including a light deflector for deflecting a light beam to scan a surface, said scanning optical system being adapted to be disposed

between the light deflector and the scanned surface for focusing the deflected light beam onto the scanned surface and for keeping the scanned surface and a light beam deflecting point in substantially conjugate relationship in an auxiliary scanning direction, said scanning optical system comprising:

a saddle-shaped convex toroidal surface having a radius of curvature in a cross section along the auxiliary scanning direction, said radius of curvature being progressively greater in a direction away from the optical axis of the scanning optical system; and



the scanning optical system satisfying the following condition:

$$d/f_M > 0.6$$

where f_M is the focal length of the scanning optical system in a main scanning plane and d is the distance on the optical axis between said saddle-shaped toroidal surface and the scanned surface.

4,955,683

APPARATUS AND A METHOD FOR COUPLING AN OPTICALLY OPERATIVE DEVICE WITH AN OPTICAL FIBER

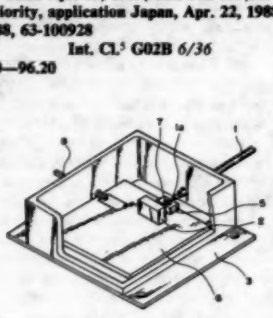
Nobuo Shiga; Takeshi Sekiguchi, and Keigo Aga, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 18, 1989, Ser. No. 339,799

Claims priority, application Japan, Apr. 22, 1988, 63-100927; Apr. 22, 1988, 63-100928

Int. Cl.[5] G02B *6/36*

U.S. Cl. 350—96.20 **19 Claims**



15. A method of fabricating a device for coupling an optically operative device with an optical fiber, said method comprising the steps of:

affixing a saddle and an optically operative device on a single ceramic board;

disposing said ceramic board in a metal package,

placing a solder block having a bridge-like shape on said saddle,

inserting a leading edge of an optical fiber through an opening provided in said metal package into said metal package so that said solder block bridges over said optical fiber; and,

positioning said optical fiber in optical connection with said optically operative device and thereafter melting said solder block to affix said optical fiber on said saddle.

4,955,684

OPTICAL MODULE COUPLING DEVICE

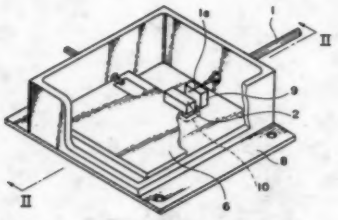
Nobuo Shiga, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 9, 1989, Ser. No. 391,050

Claims priority, application Japan, Aug. 24, 1988, 63-210119

Int. Cl.[5] G02B *6/42*

U.S. Cl. 350—96.20 **10 Claims**



9. An optical module coupling device comprising:

a metallic package;

a substrate made of insulative material and provided on the bottom of said package, said substrate having a conductive land thereon; and

a chip carrier mounted on said substrate and having an optical unit to be optically coupled with an end of an optical fiber extending into said package;

said bottom of said package having a recess at an area which is opposite to said land, and said device including a parallel plate capacitor formed by said land and said bottom of said package.

4,955,685

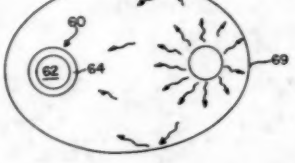
ACTIVE FIBER FOR OPTICAL SIGNAL TRANSMISSION

Jonathan D. Garman, Los Altos, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Feb. 21, 1989, Ser. No. 312,907

Int. Cl.[5] G02B *6/10*

U.S. Cl. 350—96.3 **21 Claims**



1. An improved optical fiber for carrying an optical signal comprising:

an optically transparent core having a first index of refraction, said core being doped with a lasing material such that said core is doped having the greatest concentration of said dopant at the center of said core and said dopant is diffused outward from said center into said cladding:

an optically transparent cladding surrounding said core having a second index of refraction which is lower than said first index of refraction;

pumping means spatially disposed parallel to said cladding for providing light through said cladding and into said core, such that said lasing material lases at a desired wavelength and provides continuous gain for said optical signal;

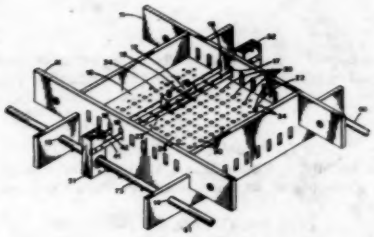
whereby said optical signal is provided gain by said lasing.

4,955,686

OPTICAL FIBER CROSSCONNECT SWITCH

Carl F. Buhrer, Framingham; W. John Carlsen; Sarah S. Cousins, both of Boston, and Alfred H. Bellows, Wayland, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jan. 16, 1989, Ser. No. 367,909
Int. Cl.[5] G02B 6/36
U.S. Cl. 350—96.20 16 Claims



9. An optical fiber crossconnect switch for the reconnection of n input optical fibers, each terminated in a standard connector device, with n output optical fibers, each terminated in a standard connector device, comprising:

a plate having an n-by-n array of optical fiber connector adapters;

n input optical fiber connectors on a first side of said plate, each of which is repositionable along one row of said array to any of n positions each in a different column of said array;

n output optical fiber connectors on a second side of said plate opposite to said first side, each of which is repositionable along one column of said array to any of n positions each in a different row of said array; and

repositioning means on each side of said plate, comprising:

2n carriers, one carrier for each of said 2n optical fiber connectors;

means to mount one optical fiber connector in each of said carriers;

each of said first n carriers being positioned over one of said n rows of adapters on said first side of said plate;

each of said second n carriers being positioned over one of said n columns of adapters on said second side of said plate;

means to raise each of said carriers to disengage said connector within said carrier and means to lower each of said carriers to engage said connector in an adjacent one of said adapters; and

means to move said carrier linearly from one adapter position to another adapter position in the same row or column;

whereby each of said 2n optical fibers may be repositioned by withdrawing its connector from one of said adapters, translating said connector along a row or column and reinserting said connector into an adjacent adapter in the same row or column;

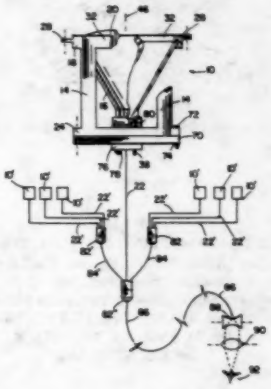
such that any one of said n input optical fibers terminated in a standard connector on one side of said plate may be connected through one of said adapters to any one of said n output optical fibers terminated in a standard connector on said second side of said plate, whereby said output optical fiber will carry the same light that entered at the input optical fiber to which it is connected.

4,955,687

FIBER OPTIC TELESCOPE

Thomas L. Pafford, 419 Sun Rise Ave., Cocoa Beach, Fla. 32931

Continuation-in-part of Ser. No. 889,223, Jul. 25, 1986, Pat. No. 4,828,348. This application Mar. 8, 1989, Ser. No. 320,528
Int. Cl.[5] G02B 6/06
U.S. Cl. 350—96.25 14 Claims



1. A fiber optic telescope for delivering a coherent image, i.e., coherent electromagnetic radiation to a locus of useful application, comprising:

(a) at least two collector cells for collecting the electromagnetic radiation;

(b) first focussing means for focussing the coherent electromagnetic radiation collected by said at least two collector cells;

(c) first fiber waveguide means having a collector cell end and a converging end and being in optical communication at its collector cell end with said at least two collector cells for receiving the coherent image, i.e., the coherent electromagnetic radiation from said at least two collector cells and in optical communication at its converging end with a converging means; and

(d) a converging means for receiving the coherent electromagnetic radiation from said first waveguide means and focussing and converging the coherent image, i.e., the electromagnetic radiation and directing it to a locus of useful application.

4,955,688

OPTICAL FIBER PACKAGE AND METHODS OF MAKING

John T. Chapin, Alpharetta; Charles W. Jackson, Dunwoody; Thomas O. Mensah, Doraville, and Mickey R. Reynolds, Lawrenceville, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

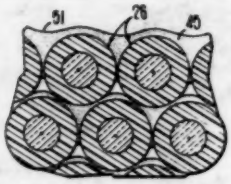
Filed Mar. 27, 1989, Ser. No. 328,930
Int. Cl.[5] G02B 6/02
U.S. Cl. 350—96.29 13 Claims

1. A package of elongated optical transmitting medium from which the elongated optical transmitting medium may be payed out, said package comprising:

a plurality of convolutions of an elongated optical transmitting medium which are disposed with adjacent convolutions being in engagement with one another; and

an adhesive material which has been applied to said convolutions and which comprises a mixture which includes a silicone adhesive constituent having a modulus behavior

which is relatively stable with respect to time over a relatively wide range of temperature at payout speeds which may be at least as much as about 300 meters per second.



4,955,689

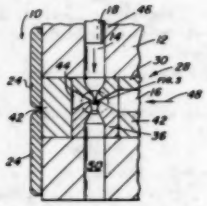
IR TRANSMITTING OPTICAL FIBER

Terry A. Fuller, Highland Park; Vijay J. Nadkarni, Mundelein, and John R. Peschke, Woodstock, all of Ill., assignors to Fuller Research Corporation, Huntingdon Valley, Pa.

Division of Ser. No. 134,276, Dec. 17, 1987. This application Oct. 24, 1988, Ser. No. 261,958

Int. Cl.[5] G02B 6/00

U.S. Cl. 350—96.34 12 Claims



1. An optical fiber comprising:

(a) a halide core having a substantially single crystal of said halide across an axial face of said core, said single crystal extending axially along said core; and

(b) a polycrystalline halide cladding surrounding said core, said core and said cladding having different indices of refraction from one another, said core being prepared by the extrusion of a first halide billet through a first die after said first billet was heated to a temperature just below its melting point, and said cladding being prepared by the extrusion of a second halide billet through a second extrusion die after said second billet was heated to a temperature just below its melting point.

4,955,690

THIN CALIPER RETROREFLECTIVE TRANSFER

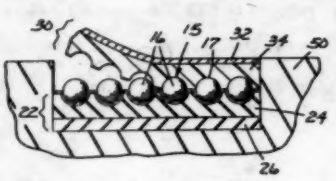
Chester A. Bacon, Jr., Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 24, 1989, Ser. No. 326,480

Int. Cl.[5] G02B 5/128, 5/134

U.S. Cl. 350—105 22 Claims

1. A retroreflective transfer comprising (a) support layer, at least the back stratum of which is a vulcanizable or curable elastomer, said support layer having an effective thickness of less than about 3 mils; (b) a monolayer of retroreflective elements partially embedded in and protruding from said support layer, at least some of said retroreflective elements being oriented such that the front surfaces of said retroreflective elements protrude from said support layer so as to permit light incident thereto to be retroreflected by said retroreflective elements; and (c) a dimensionally stable premask releasably adhered to the front surfaces of said retroreflective elements.



4,955,691

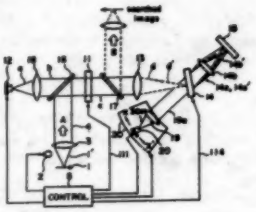
OPTICAL PARALLEL PROCESSOR

Hironobu Mifune; Toshio Inada; Aki Ueda, and Yukio Ogura, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Japan

Filed Jun. 13, 1989, Ser. No. 367,755

Int. Cl.[5] G02B 26/08, 27/42, 27/46

U.S. Cl. 350—162.13 8 Claims



1. An optical processing system comprising:

first light source means for producing a first coherent optical beam;

modulating means written with, an input image for modulating said first coherent optical beam passing therethrough according to the input image, wherein said modulating means comprises a medium for allowing erasing and rewriting of information by a writing optical beam and is provided in an optical path of the first coherent optical beam;

image input means for writing the input image on said modulating means by means of an incoherent optical beam;

optical Fourier transform means provided in an optical path of the first coherent optical beam exited from the modulating means for producing a Fourier transform of the input image on its focal plane;

optical memory means for storing a plurality of image informations in the form of a Fourier transform hologram at the focal plane of said optical Fourier transform means, wherein said optical memory means comprises a medium which allows erasing and rewriting of information by said modulated, first coherent optical beam and produces a number of second coherent optical beams which differ in angle from each other responsive to irradiation of the first coherent optical beam via said optical Fourier transform means;

image detection/light source means for producing a third coherent optical beam in correspondence to the one of the second optical beams which has the maximum intensity along a path of said second coherent optical beam in an approximately reversed direction, said third coherent

optical beam producing a fourth coherent optical beam as an output beam upon incidence to the optical memory means such that the fourth coherent optical beam propagates in a direction opposite to that of the first coherent optical beam;

second light source means provided so as to irradiate said optical memory means by a fifth coherent optical beam as a reference light for rewriting the information;

image output means provided in an optical path of the fourth coherent optical beam for directing the fourth coherent optical beam to outside of the system; and

a controller connected to said image input means, first light source means and second light source means for controlling energization of said image input means and said first and second light source means, said controller being further connected to said modulating means and optical memory means for clearing information written thereon.

4,955,692

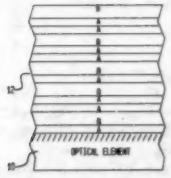
QUASI-PERIODIC LAYERED STRUCTURES

Roberto Merlin, and Roy Clarke, both Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Filed Aug. 19, 1986, Ser. No. 898,015

Int. Cl.[5] G02B 1/10

U.S. Cl. 350—166 **17 Claims**



1. A process of making an optical coating for reflecting x-ray energy having a predetermined wavelength characteristic, the optical coating being formed of a respective plurality of each of n types of thin film layers, the process comprising the steps of:

first defining the n types of thin film layers, where n is an integer having a value which is at least three, each of the n types of thin film layers being characterized by a respective predetermined thickness in the range of approximately between 5Å and 5000Å and corresponding substantially to the predetermined wavelength characteristic of the x-ray energy;

second defining a selection matrix having n columns by n rows, said selection matrix having a non-zero determinant and a first element equal to unity, for determining a quasi-periodic sequence of said n types of layers; and

applying a respective plurality of the n types of thin film layers, said application of said pluralities of said n types of the thin film layers being performed so that respective ones of the n types of the thin film layers are interleaved in accordance with a predetermined sequence of groupings of the thin film layers, each grouping in said predetermined sequence of groupings being configured in response to the configuration of a sequence of a prior grouping of the thin film layers, and in response to said selection matrix which defines the configuration of the sequence of each subsequent grouping.

4,955,693

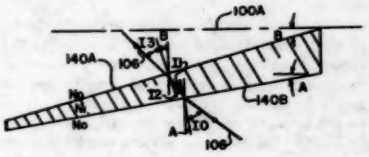
LASER SCANNER HAVING IMPROVED OPTICAL SCANNING WINDOW

Mohan L. Bobba, Eugene, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jun. 9, 1989, Ser. No. 364,083

Int. Cl.[5] G02B 27/02; G06K 7/10

U.S. Cl. 350—319 **17 Claims**



8. A laser scanner comprising:

a scanning face including an opening therein through which a laser beam is scanned to define a scanning pattern extending from said face;

laser beam generating means for producing a laser beam;

laser beam sweeping means for receiving said laser beam and sweeping said laser beam through said opening;

window means formed of optical material and associated with said opening for protecting said laser scanner and passing said laser beam through said opening; and

support means for supporting said window means such that at least one surface thereof is angularly oriented relative to said scanning face to improve the incidence angles of said laser beam on said window means and/or the refractive angles at said window means to increase an effective scan volume of said laser scanner.

4,955,694

PROCESS FOR PRODUCING HOE'S FOR USE IN COMBINATION TO PRODUCE A TELECENTRIC BEAM

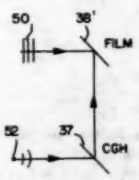
Beda Käser, Brügg, Switzerland, assignor to Zumbach Electronic AG, Orpund, Switzerland

Division of Ser. No. 29,436, Mar. 23, 1987, Pat. No. 4,832,426. This application Oct. 27, 1988, Ser. No. 224,990

Claims priority, application Switzerland, Apr. 3, 1986, 1299/86

Int. Cl.[5] G03H 1/04; G02B 5/32

U.S. Cl. 350—320 **3 Claims**



1. A method of producing a first holographic optical element from a light sensitive material, that can be combined with a second holographic optical element to direct a telecentric light beam from the first holographic optical element in a plane in a telecentric direction, by diffraction of a light beam deflected through an angular range at a focal point of the combination of the first holographic optical element and the second holographic optical element, the method comprising the steps of:

disposing a point light source, the second holographic optical element and the light sensitive material in successively spaced relation with the second holographic optical ele-

ment between the point light source and the light sensitive material, the point light source and the second holographic optical element being disposed at positions relative to the light sensitive material that are the same as the respective positions, in the combination, of the intended focal point of the combination and the second holographic optical element relative to the first holographic optical element to be produced;

illuminating the second holographic optical element with coherent wavefronts of radiation from the point light source;

directing the radiation from the second holographic optical element onto the light sensitive material such that the radiation impinges on the light sensitive element at respective positions which are spaced apart by respective distances measured in the plane in a direction perpendicular to the intended telecentric direction of the telecentric beam, the distances being linearly related to angles of the radiation relative to the point light source as it leaves the point light source; and

concurrently with said steps of illuminating and directing, illuminating the light sensitive material with wavefronts of coherent light from a plane wave running in the intended telecentric direction.

4,955,695

LIQUID CRYSTAL DISPLAY DEVICE

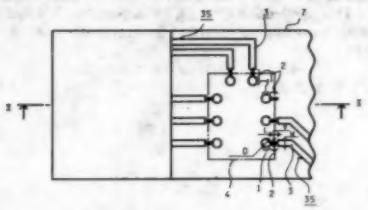
Kiichiro Kubo, and Masamichi Moryia, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 22, 1988, Ser. No. 274,906

Claims priority, application Japan, Dec. 2, 1987, 62-303106

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—331 R **6 Claims**



1. A liquid crystal display device including two substrates which contain a liquid crystal therebetween, said liquid crystal display device further including:

means disposed on at least one of said two substrates for mounting an electronic part thereon, said mounting means comprising a plurality of solder-receiving sections where at least one terminal of said electronic part is soldered to said at least one substrate and wiring for connecting said plurality of solder-receiving sections to additional portions of said at least one substrate, wherein necks of a predetermined length are provided in said wiring at positions between said plurality of solder-receiving sections and a remaining portion of said wiring, said necks having a width which is less than that of said remaining portion of said wiring and which is less than a diameter of said solder-receiving sections.

4,955,696

LIQUID CRYSTAL DRIVING SYSTEM

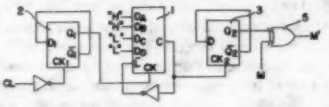
Koki Taniguchi, Osaka, and Tamaki Mashiba, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 879,638, Jun. 27, 1986, abandoned. This application Aug. 14, 1989, Ser. No. 394,158

Claims priority, application Japan, Jun. 28, 1985, 60-143570

Int. Cl.[5] G02F *1/13*; G09G *1/14, 3/00, 3/36*

U.S. Cl. 350—332 **11 Claims**



1. A system for driving a liquid crystal display having a plurality of segment electrodes and a plurality of common electrodes, picture elements being defined at intersections between said segment electrodes and said common electrodes, comprising:

means for providing data signals of a specific duty factor;

means for driving said common electrodes with said data signals; and

means for applying AC-converted signals to said picture elements at a frequency that is different from said specific duty factor and higher than a frame frequency at which said display is scanned, said means for applying AC-converted signals includes counter means which includes inputs set at predetermined logic high or low levels which selectively determine the frequency of the AC-converted signals and which variably alternates the AC-converted signals within each frame.

4,955,697

LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF DRIVING THE SAME

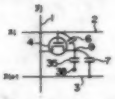
Toshihisa Tsukada, Musashino; Yoshiyuki Kaneko, Kokubunji, and Akira Sasano, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

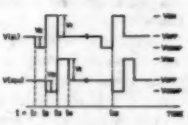
Filed Apr. 19, 1988, Ser. No. 183,141

Claims priority, application Japan, Apr. 20, 1987, 62-95125

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—332 **8 Claims**





1. A liquid crystal display panel comprising:

a first substrate;

a second substrate having a transparent conductive film thereon;

a liquid crystal layer sandwiched between the first and the second substrates;

a plurality of pixel electrodes formed on the first substrate and associated with respective intersections of parallel

rows and parallel columns wherein the rows comprise a plurality of gate lines and the columns comprise a plurality of data lines;

a plurality of thin film transistors formed on the first substrate for driving the pixel electrodes, respectively, each transistor having a gate connected to an associated gate line and two electrodes one of which is connected to one of the plurality of pixel electrodes and another electrode is connected to an associated data line;

the plurality of gate lines being driven successively in a predetermined order for on-off control of the thin film transistors, each of the pixel electrodes in each one row being made to overlap the gate line in another row adjacent to the one row so as to provide capacitive coupling between the overlapping pixel electrode and the gate line; wherein the capacitive coupling between the overlapping pixel electrode and the gate line is represented by a capacitance C_{add} which satisfies the following formula:

$$C_{add}=(V_1/V_2)C_{gs}$$

where Cgs indicates a parasitic gate-source capacitance of the thin film transistor;

means for applying a driving voltage to each one of the plurality of gate lines, the driving voltage having a waveform which is at a voltage level V_{ON} when the thin film transistors connected to said one gate line are to be ON-state, at a voltage level V_{OFF} when said thin film transistors are to be OFF-state, and a voltage level V_{COMP} just before said driving voltage goes up to the voltage level V_{ON} and when the driving voltage applied to the precedingly driven gate line is at the voltage level V_{ON}, where $V_{ON}>V_{OFF}>V_{COMP}$.

4,955,698

OPTO-ELECTRONIC INDICATING MATRIX, AND INDICATING DEVICE PROVIDED THEREWITH

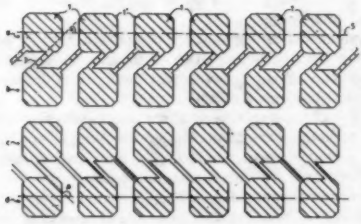
Peter Knoll, Ettlingen; Winfried König, Pfinztal-Berghausen; Rüdiger Mock-Hecker, Karlsruhe, and Clemens Günther, Sexau, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 322,781

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806843

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—336 **9 Claims**



1. An opto-electronic indicating matrix comprising a plurality of display segments arranged in a plurality of rows and a plurality of columns, each of said plurality of display segments being spaced from an adjacent display segment in a respective row and a respective column by a same distance; and a plurality of conductors located in regions between pairs of rows of said display segments for connecting display segments in different rows, each of said conductors being arranged at an angle to a longitudinal axis of said rows.

4,955,699

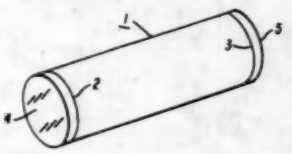
PRECIOUS METAL DOPED CRYSTALS FOR HARDENING OF THE CRYSTALS

Narsingh B. Singh, Murrysville; Tom Henningsen; Robert Mazelsky, both of Monroeville; Richard H. Hopkins, Murrysville, and Milton S. Gottlieb, Churchill Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 113,843, Oct. 28, 1987. This application Nov. 23, 1988, Ser. No. 276,093

Int. Cl.[5] G02F 1/01, 1/11, 1/33

U.S. Cl. 350—353 **25 Claims**



1. A crystalline structure selected from the group consisting of thallium arsenic selenide, thallium arsenic sulfide, thallium vanadium sulfide, thallium phosphorous selenide, lead halide, and mixtures thereof, where said crystalline structure is doped by a precious metal selected from the group consisting of copper, silver, gold and mixtures thereof, in an amount of about 25 ppm by weight up to about 3 ppm by weight.

4,955,700

SMALL-SIZE ZOOM LENS SYSTEM

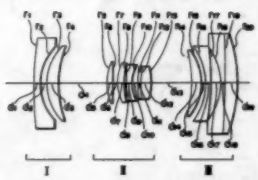
Takao Yamaguchi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 398,915

Claims priority, application Japan, Aug. 30, 1988, 63-215967

Int. Cl.[5] G02B 15/15, 9/64

U.S. Cl. 350—423 **8 Claims**



1. A small-size zoom lens system comprising:

a first lens group, a second lens group, and a third lens group which are successively arranged from an object side to an image side;

said first, second, and third lens groups having negative, positive, and negative focal lengths, respectively;

said first, second, and third lens groups being movable toward the object side for zooming movement from a wide angle end toward a telephoto end, while varying the distances between the first, second, and third lens groups;

the focal length of the ith lens group (i=1, 2, 3), and the focal length fw of the entire zoom lens system at the wide angle end of zooming movement satisfying the following conditions:

$$0.3<|f_3|/|f_1|<1$$

$$1.2<|f_1|/fw<2.3$$

$$0.9<|f_3|/fw<1.4$$

4,955,701

APOCHROMAT OPTICAL SYSTEM

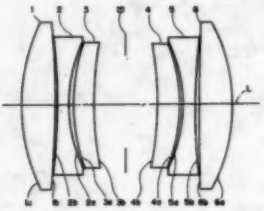
Yoshikazu Katsoka; Zenji Wakimoto, both of Kyoto, and Takeshi Sugata, Hikone, all of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed May 1, 1989, Ser. No. 345,482

Claims priority, application Japan, May 2, 1988, 63-109701

Int. Cl.[5] G02B *9/62*

U.S. Cl. 350—481 **4 Claims**



1. An apochromat optical system, comprising:

a stop provided along the optical axis of the system;

a first lens group including: a first lens having a positive power, said first lens having a convex surface which is directed to the object side; a second lens made of Kultz Flint glass having an Abbe's number within the range from 45.0 through 34.0, said second lens having a negative power and having a concave surface which is directed to the image side; and a third lens in the form of meniscus having a positive power, said third lens having a convex surface which is directed to the object side, said first through third lenses being successively disposed in order from the object side of the system, and

a second lens group including a set of lenses having substantially the same configuration as the lenses in the first lens group, the lenses of said first and second lens groups being approximately symmetrically disposed with respect to said stop;

the lenses of said first lens group satisfying the following:

$$n_3 > n_2$$

$$1.08 > \{(n_1+n_3)/2\}/n_2 > 1.01$$

$$\nu_1 > \nu_2$$

$$\nu_3 > \nu_2$$

$$1.3 > \{(\nu_1+\nu_3)/2\}/\nu_2 > 1.0 \text{ and}$$

wherein n_1, n_2 and n_3 represent the refractive index of the first, second and third lenses, respectively; and ν_1, ν_2 and ν_3 are the Abbe's numbers of the first, second and third lenses, respectively.

4,955,702

FIXED FOCUS BINOCULAR WITH VISUAL ACUITY COMPENSATING MECHANISM

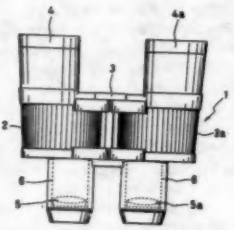
Masakazu Nakamura, 6-5, Maeno-cho, 6-chome, Itabashi-ku, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,503

Int. Cl.[5] G02B *7/06, 25/00, 23/18*

U.S. Cl. 350—556 **3 Claims**

1. A binocular for viewing both near and distant objects at a constant focus presettable for the visual acuity of the view comprising: visual acuity compensating means for presetting the binocular focus to the visual acuity of a user prior to normal viewing including manually operated focussing means for changing the spacing between an ocular lens and an objective lens of the binocular and means for preventing access to said



focussing means during normal viewing thereby to maintain the focus constant.

4,955,703

DEVICE FOR AN OUTSIDE MIRROR FOR MOTOR VEHICLES

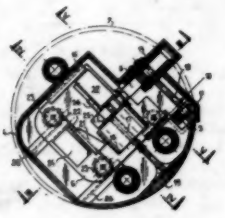
Miroslaw Janowicz, Feurigstrasse 46, D-1000 Berlin 62, Fed. Rep. of Germany

Filed Feb. 17, 1989, Ser. No. 312,631

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805371

Int. Cl.[5] B60R *1/06*

U.S. Cl. 350—637 **16 Claims**



16. Apparatus for an outside mirror for motor vehicles which is electrically slowly shiftable to adjust the mirror to an individual driver, and rapidly shiftable by switch means from the driver-adjusted position to a temporary blind-spot viewing position, comprising:

a supplemental device mounted adjacent said mirror having a first element mounted therein for oscillating movement with said mirror between two limit points defining the limit of movement of said mirror,

a second element releasably connected to said first element by locking means during the slow shifting of said mirror,

said second element supporting a limit switch actuating element defining one of said limit points,

a limit switch mounted in said supplemental device adjacent said limit switch actuating element and connected to drive means for said mirror to stop or reverse the movement of said mirror when said actuating element is contacted by said first element,

said actuating element movably mounted on said second element for movement in response to the motion of said second element connected to said first element to alter the limit point defined thereby, and

a third element extending from said mirror into said supplemental device, said third element engaging said first element at one end and said mirror at the other end.

4,955,704

SHIFTABLE OUTSIDE REARVIEW MIRROR FOR USE ON VEHICLES

Miroslaw Janowicz, 1000 Berlin 62, Sch',uml/o/ neberg, 46, Feurigstraβe, Fed. Rep. of Germany

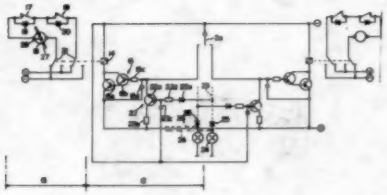
Continuation of Ser. No. 183,590, Apr. 19, 1988, abandoned, which is a continuation of Ser. No. 910,218, Aug. 20, 1986, Pat. No. 4,792,220. This application Jun. 12, 1989, Ser. No. 366,235

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508348; Oct. 3, 1985, 35359

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.[5] G02B 5/08; H01H 3/16, 9/00

U.S. Cl. 350—637 20 Claims



14. A shiftable outside mirror for use on a vehicle having a turn signal lever arm and switch means operable to shift said mirror, wherein the improvement comprises:

said switch means being pivotally mounted on said turn signal lever arm, pivotal relative to said turn signal lever arm in a plane substantially parallel to the plane of motion of said turn signal lever arm from a rest position to an activated position in which the mirror is shifted;

said switch means being movable with said turn signal lever arm when in said rest position such that only a turn signal is actuated;

said switch means being movable with said turn signal lever arm when in said activated position such that said mirror is shifted and corresponding turn signal is actuated, said shiftable outside mirror having a planar mirror element and motor means for rotating said element about an essential vertical axis; wherein

the longitudinal axis of said switch means in its rest position is essentially a continuation of the longitudinal axis of said turn signal lever arm, such that an end portion of said turn signal lever arm and an end portion of said switch means are interfittingly engaged by spring means engaging both of said end portions, said spring means comprising a U-shaped spring having two free ends and a base, the free ends engaging said end portion of said switch means, said base engaging said end portion of said turn signal lever arm.

4,955,705

MULTI-LAYERED BACK REFLECTING MIRROR

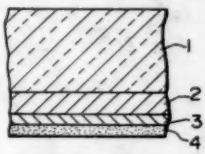
Yuji Nakajima, Tokyo; Katsunori Ishida, Fussa, and Masashi Mochizuki, Hoya, all of Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Aug. 11, 1989, Ser. No. 392,590

Claims priority, application Japan, Aug. 31, 1988, 63-217291

Int. Cl.[5] G02B 5/08, 5/28

U.S. Cl. 350—642 12 Claims



1. A multi-layered back reflecting mirror comprising a substrate, a dielectric multi-layered film formed on one side of the substrate and a metal or semiconductor film formed on the dielectric multi-layered film, the dielectric multi-layered film comprising at least one high refractive index material layer having an optical thickness of $\lambda_0/2$ (λ_0 is the wavelength of a light used as the reference measurement for design purposes) and at least one low refractive index material layer having an optical thickness of 0.05–0.4λ_0, the high refractive index material layer existing closer to the substrate relative to the low refractive index material layer, and the low refractive index material layer existing closer to the metal or semiconductor film relative to the high refractive index material layer.

4,955,706

COMPOSITE POLYMERIC SPECTACLE PARTS

Johann J. Schmidthaler, and Ronald Zach, both of Linz, Austria, assignors to Optyl Eyewear Fashion International Corporation, Norwood, N.J.

Filed Sep. 30, 1988, Ser. No. 252,265

Int. Cl.[5] G02C 11/02

U.S. Cl. 351—41 3 Claims

1. A composite, integral polymeric spectacle part comprising a first polyamide member and a second polyamide member, said first polyamide member having a melting point of from about 160° C. to about 170° C. and said second polyamide member having a melting point of from about 175° C. to about 185° C., said second polyamide member having an injection molding temperature at least 40° C. higher than the melting point temperature of said first polyamide member and said second polyamide member having been heat fusion bonded to said first polyamide member to form said integral spectacle part.

4,955,707

PIVOTING OPTICAL ACCESSORY FOR USE WITH SPECTACLES

Albert E. Gazeley, San Po Kong, Hong Kong, assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 21, 1986, Ser. No. 842,640
Int. Cl.[5] G02C 9/00
U.S. Cl. 351—47 **16 Claims**

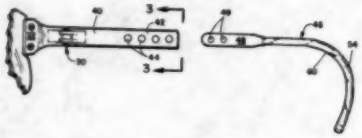
1. An optical accessory for use in combination with spectacles of the type including a pair of optical elements and means for holding the elements in spaced apart relationship and for defining accessory cooperating structure intermediate the elements, said intermediate structure including brow bar, nose bridge and side segments, said accessory comprising: a pair of optical members, means for connecting said members in space apart relationship, means for releasably attaching said accessory to the cooperating structure such that when said accessory is attached to the cooperating structure, movement of said accessory in substantially all directions in a generally vertical plane defined by the structure is inhibited, said accessory including top, bottom and side portions, said top and bottom portions yieldably engage the top of the brow bar and the bottom of the nose bridge, respectively, which inhibits up and down movement of said accessory, said side portions engage corresponding ones of the side segments which inhibits side-to-side movement of said accessory and means for pivotally mounting said releasably attaching means to said connecting means such that when said attaching means is attached to the structure said optical members can be pivoted between raised and lowered positions relative to the optical elements.

4,955,708

SUNGLASSES HAVING ADJUSTABLE TEMPLES

Alan Kahaney, 2212 Place Monaco, Del Mar, Calif. 92014

Filed Apr. 20, 1989, Ser. No. 340,700
Int. Cl.[5] G02C 7/10, 5/20
U.S. Cl. 351—44 **3 Claims**



1. Sunglasses having adjustable temple assemblies comprising:

a sunglasses lens assembly having a right end and a left end;

a pair of temple assemblies each having a front end and a rear end;

means for attaching the front ends of the respective temple assemblies to the respective right and left ends of said sunglasses lens assembly;

said temple assemblies each having means for adjusting their length to conform to different sized heads comprising each of said temple assemblies having an elongated member having a front end and a rear end, the rear end of said elongated member having a sleeve portion that also has an inner surface, a plurality of apertures in said inner surface at longitudinally spaced intervals, a leg member having a head portion and an ear engagement portion, said head portion having an inner surface having a plurality of protrusions that are matingly received in the apertures of said sleeve portion; and

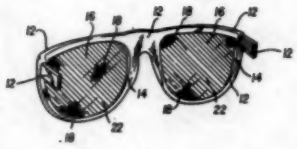
said temple assemblies each having means for adjusting the manner in which they engage the wearer's ears comprising said ear engagement portion having a front end and a rear end, said ear engagement portion of said leg having a bendable cylindrical wire core extending longitudinally throughout its length from its front end to its rear end and being surrounded by a sleeve of bendable material having an outside surface with a plurality of longitudinally spaced annular grooves formed therein, these annular grooves provide points for bending said ear engagement portion into a configuration that grips the ears of the wearer.

4,955,709

SUN SCREENING DISPLAY AND ADVERTISING DEVICE

Anton K. Smith, 610 E. 6th St., Little Rock, Ark. 72202

Filed Apr. 24, 1987, Ser. No. 42,037
Int. Cl.[5] G02C 7/16, 7/10
U.S. Cl. 351—46 **7 Claims**



1. An advertising or ornamental display device in the form or spectacles comprising:

a conventional eyeglass frame for supporting lenses before the eyes of the wearer;

opaque, perforated, sheet-material lenses disposed in said eyeglass frame, said lenses are made of a clear plastic material and opacity is provided by adhering opaque film coating on the exterior surface, said lenses having a plurality of equi-distant openings therethrough disposed throughout the entire extent of said lenses, said openings having a major dimension of between 0.01–0.10 inches and permitting substantially uninhibited vision by the wearer throughout the entire extent of said opaque lenses while providing to persons other than the wearer, an outer surface on said lenses defining an apparent uninterrupted and continuous appearance, and

a design or message indicia on said outer surface of said lenses whereby,

said lenses provide protection for the eyes of the wearer while allowing substantially unrestricted vision on the part of the wearer and presenting a clear display of said indicia to persons other than the wearer.

4,955,710

ADJUSTABLE HEADBAND ASSEMBLY ATTACHED TO SPECTACLES FRAME STEMS

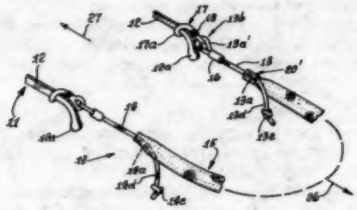
William R. Meistrell, Manhattan Beach, Calif., assignor to Dive N'Surf, Inc., Hermosa Beach, Calif.

Filed Sep. 18, 1989, Ser. No. 408,667
Int. Cl.[5] G02C 3/00
U.S. Cl. 351—156 **15 Claims**

1. An adjustable retainer for a spectacles frame, comprising, in combination:

(a) an elongated band assembly including multiple bands, the assembly being generally U-shaped,

(b) at least two of the bands having adjustable, lengthwise, relatively slidable interfit,
(c) whereby the overall length of the U shaped assembly may be quickly adjusted to fit the wearer's head,
(d) said assembly including first, second and third bands, end portions of the first and second bands having said adjustable, lengthwise, relatively slidable interfit, and other band end portions also having adjustable, lengthwise, relatively slidable interfit,
(e) the first band having a free end portion that dangles and can be pulled to adjust the interfit of the first and second bands.

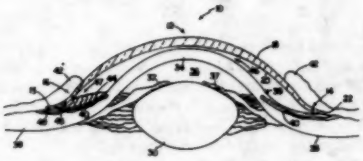


4,955,711

CONTACT LENSES FOR ANIMALS

Randall E. Wise, Wellesley, Mass., and Alvah T. Leighton, Jr., Blacksburg, Va., assignors to Animalens, Inc., Wellesley, Mass.

Filed Nov. 30, 1987, Ser. No. 126,551
Int. Cl.[5] G02C *7/04*; A01K *37/00*
U.S. Cl. 351—160 R **31 Claims**



1. A contact lens for an eye of an animal having a nictitating membrane, said contact lens comprising
a curved central region adapted to be spaced from the eye tissue to provide a chamber for said nictitating membrane, and
a peripheral region having a curvature opposite to that of said curved central region, said peripheral region contacting and supporting the contact lens on the eye tissue.

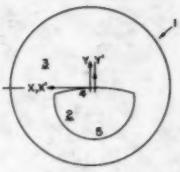
4,955,712

MULTIFOCAL LENS

Rudolf Barth, Vierkirchen; Günther Guilino, Munich, and Dieter Kalder, Mörfelden, all of Fed. Rep. of Germany, assignors to Optische werke G. Rodenstock, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 876,855, Apr. 9, 1986, abandoned. This application Jul. 18, 1989, Ser. No. 380,781
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430334
Int. Cl.[5] G02C *7/06*
U.S. Cl. 351—169 **8 Claims**

1. A multifocal ophthalmological lens comprising a front surface facing away from the eye and a rear surface facing toward the eye, the lens having a main portion designed for distance vision and an added portion constituting a near segment designed for near vision, at least one surface of the added portion being composed of a progressive zone having at least one progressive surface in which the refractive power increases, the main portion and the near segment are separated by transition lines, on which transition lines the surface is not twice continuously differentiable, the lens having a main meridian and further comprising the following features:
the refractive power of the main portion being constant except for possible aspheric corrections of peripheral abberations, and



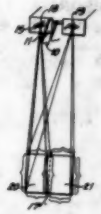
the progressive surface of the added portion being formed in such manner that, for the progressive surface in which the refractive power increases, the radius of curvature of the intersecting lines of planes orthogonal to the main meridian in the entire portion of the surface
decreases, with increasing distance from the main meridian at least in a region surrounding the main meridian, if the progressive surface is the front surface of the lens, or
increases, with increasing distance from the main meridian at least in a region surrounding the main meridian, if the progressive surface is the rear surface of the lens.

4,955,713

SPECTACLES FOR IMPROVING BINOCULAR VISION

Mohammad T. Naderi, Isabellaland 896 2591 ST, The Hague, Netherlands

Continuation-in-part of Ser. No. 73,644, Jul. 15, 1987, abandoned. This application Oct. 20, 1988, Ser. No. 260,272
Int. Cl.[5] A61B *3/00*
U.S. Cl. 351—200 **3 Claims**



1. A spectacle which divides a screen between the eyes of an observer comprising a spectacle frame and two viewing lenses, said spectacle further comprising a socket centrally mounted on the outer part of said spectacle frame, a rectangular plate member defined by two elongated sides and two short edges, a bar member extending from one of said short edges of said rectangular plate member and a ball member fixed at the end of said bar member, said ball member being disposed within said socket, said rectangular plate member being deflectable toward the left lens and the right lens by said bar member and said ball member.

4,955,714

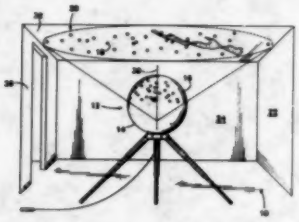
SYSTEM FOR SIMULATING THE APPEARANCE OF THE NIGHT SKY INSIDE A ROOM

James G. Stotler, 16 SE. 50th Ave., Portland, Oreg. 97215, and Dennis G. Lowe, 3610 NE. 113th, Portland, Oreg. 97220

Filed Jun. 26, 1986, Ser. No. 879,155

Int. Cl.[5] G03B *21/00*

U.S. Cl. 353—62 10 Claims



1. Apparatus for projecting an adjustable pattern of light spots on interior surfaces of a substantially conventional room, so that the interior surfaces can be painted with spots of paint at the location of said light spots, said apparatus comprising:

a light source;

a container surrounding said light source, said container having a substantially vertical central axis and being perforated with apertures such that when said container is placed within the room, light from said light source passes through said apertures and creates a pattern of light spots on the interior surfaces of the room, said apertures being arranged such that said pattern of light spots resembles an arrangement of stars in a known stellar constellation;

means for adjustably positioning said light source within said container to alter said pattern of light spots; and

a stand supporting said container and having a plurality of legs of independently adjustable length such that said container can be tilted to adjustable position said pattern of light spots on the interior surfaces of the room,

wherein said light source comprises a light bulb having a filament of length short enough so that said apertures are substantially as wide in shortest dimension as said filament length.

4,955,715

PSUEDO FORMAT CAMERA

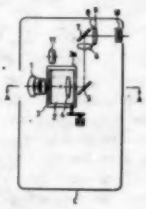
Nozomu Kitagishi, Hachioji, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,559

Claims priority, application Japan, Oct. 31, 1988, 63-276876; Oct. 31, 1988, 63-267877

Int. Cl.[5] G03B *19/12, 13/10*

U.S. Cl. 354—155 14 Claims



1. A single-lens reflex camera comprising:

objective lens means;

viewfinder means including a plurality of lenses;

switching means for switching the optical path of a light beam from said objective lens means between one leading to a focusing plane and one leading to said viewfinder means;

auxiliary lens means inserted to be on the image side of said objective lens means in an interlocked relation to the switching of said switching means; and

switching means for shifting said objective lens means and at least one of said auxiliary lens means and said viewfinder means to increase magnification of the viewfinder.

4,955,716

METHOD AND DEVICE TO DETERMINE A RELATIVE REFERENCE POSITION FOR AN ANGLE MEASUREMENT OF AN OBJECT

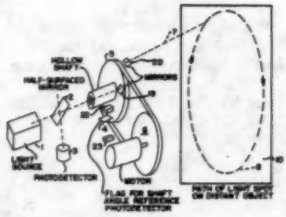
Robert J. Martin, Lynchburg, Va., assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany

Filed Jan. 5, 1989, Ser. No. 293,899

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1988, 3800121

Int. Cl.[5] G01B *11/26*

U.S. Cl. 356—152 22 Claims



1. A method to determine the relative reference position for angle measurement of an object within an angle scale covering the entire rotation of the object and divided into several incremental angles of equal size, by which a relative reference position is determined from a reference signal generated by the rotation of the object, comprising the steps of:

generating a reference signal by energy exposure of a target area on the object to be measured;

calculating a significant deviation from the reference signal at least one point during rotation of the object, this deviation being representative of an angle value of the angle scale;

determining the relative reference position of the object to be measured from said reference signal to said significant deviation; and

dividing the round angle of the object into incremental angles, beginning with the relative reference position of the object to be measured.

4,955,717

DEMAND MODULATED ATOMIZATION APPARATUS AND METHOD FOR PLASMA SPECTROSCOPY

William B. Henderson, Torrance, Calif., assignor to Geochemical Services, Inc., Torrance, Calif.

Continuation of Ser. No. 178,896, Mar. 31, 1988, abandoned, which is a continuation-in-part of Ser. No. 936,837, Dec. 2, 1986, abandoned. This application Jun. 29, 1988, Ser. No. 376,228

Int. Cl.[5] G01N *21/73*

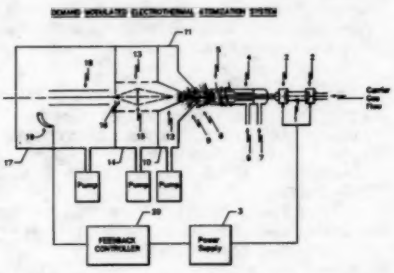
U.S. Cl. 356—316 19 Claims

1. A demand modulated atomization system for use in a spectral analysis system having an analyte measurement means for measuring desired spectral characteristics of an analyte in a plasma, the system comprising:

a. thermal atomization means for thermally atomizing the analyte;

b. a plasma generation means coupled to the output of the thermal atomization means, for creating a plasma containing the analyte;

c. a spectral detection means for measuring the content of the atomized analyte; and



d. a feedback means coupled to the spectral detection means and the thermal atomization of analyte to a preset limit, and controlling the thermal atomization means to regulate the rate of analyte atomization so as to cause the measured content of analyte to obtain an approximately fixed relationship to the preset limit.

4,955,718

PHOTOELECTRIC MEASURING SYSTEM WITH INTEGRATED OPTICAL CIRCUIT INCLUDING AND ILLUMINATING SYSTEM

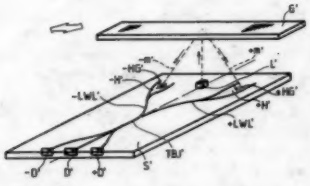
Dieter Michel, Traunstein, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Jan. 26, 1988, Ser. No. 148,556

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1987, 3702314

Int. Cl.[5] G01B 9/02

U.S. Cl. 356—356 **6 Claims**



1. In a photoelectric measuring system of the type which comprises a substrate, an integrated optical circuit on the substrate, and at least one diffraction grid shiftable with respect to the substrate in a direction transverse to a beam axis, wherein the integrated optical circuit comprises: at least two optical waveguides, coupling-in elements each configured to couple a respective diffracted component beam from the diffraction grid to a respective one of the optical waveguides, a coupler configured to receive the diffracted partial beams from the optical waveguides and to bring the diffracted component beams into interference to form a combined beam, and at least one detector positioned respond to the combined beam and to generate at least one electrical signal in response to the combined beam; the improvement comprising:

an illuminating system comprising means for generating an optical beam and means for directing the optical beam along the beam axis at the at least one diffraction grid, said generating and directing means formed as a part of the integrated optical circuit on the substrate.

4,955,719

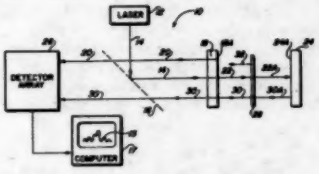
INTERFEROMETER WITH THIN ABSORBING BEAM EQUALIZING PELLICLE

John B. Hayes, Tucson, Ariz., assignor to Wyko Corporation, Tucson, Ariz.

Filed Dec. 9, 1988, Ser. No. 282,473

Int. Cl.[5] G01B 9/02, 5/22

U.S. Cl. 356—359 **14 Claims**



1. An interferometer, comprising in combination:

(a) means for producing an initial beam;

(b) means for separating said initial beam into a reference beam and a test beam;

(c) a test element which reflects said test beam;

(d) a thin, absorbing attenuator located in said test beam, said attenuator reflecting less than about ten percent of said test beam and attenuating said test beam so that its intensity is approximately equal to the intensity of said reference beam, said attenuator including a dyed pellicle;

(e) means for interfering said reference beam and said attenuated test beam to produce a fringe pattern representing differences between said test beam and said reference beam.

4,955,720

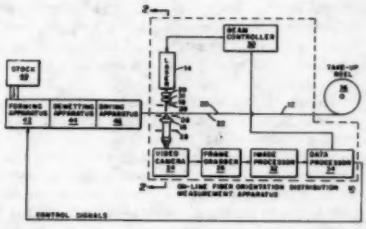
ON-LINE FIBER ORIENTATION DISTRIBUTION MEASUREMENT

William E. Blecha, Cornwall-on-Hudson, and Henry J. Kent, Bloomingburg, both of N.Y., assignors to International Paper Company, Tuxedo, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,688

Int. Cl.[5] G01N 21/86

U.S. Cl. 356—429 **21 Claims**



1. An on-line fiber orientation measurement system for measuring the orientation of fibers in a translucent sheet at least in part composed of fibers, said sheet having a first surface and a second surface, said system comprising:

a source of coherent light for producing and directing a first light pattern onto said first surface of said sheet, said first light pattern having an intensity sufficient to transmit light through said sheet and form a second light pattern on the second surface, the shape of the second light pattern being

dependent at least in part on the fiber orientation in the sheet;

a sensor for sensing said second pattern displayed on said second surface, said sensor further comprising video camera means for producing an image signal corresponding to an image of said second pattern and having a field of view that is substantially larger than the second pattern whereby relative movement of the source and sensor within a predetermined range will move the second light pattern through a range that is totally within the field of view of said camera;

means for producing a freeze frame of said image signal, said freeze frame being representative of the image of said second pattern during a period of time that is sufficiently long to allow the camera to produce an image signal and is sufficiently short to freeze the image of the second light pattern when it is moving at or below a predetermined velocity within the field of view; and

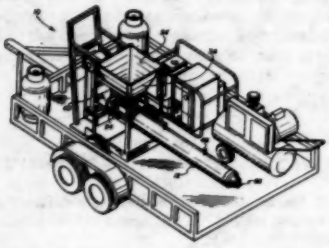
means for analyzing the shape of the second light pattern in the freeze frame to determine the orientation of fibers.

4,955,721

APPARATUS FOR APPLYING A SULPHUR-BASED STRUCTURAL MATERIAL TO PAVED SURFACES

Lloyd T. Clark, 503 St. Charles St., Arlington, Tex. 76013, and James W. Marshall, 4206 Newton St., #104, Dallas, Tex. 75219

Filed Sep. 28, 1987, Ser. No. 101,838
Int. Cl.[5] B28C *5/46*; B01F *15/02, 15/06*
U.S. Cl. 366—24 **3 Claims**



1. Apparatus for preparing a sulphur-based thermoplastic material for use in patching chuck holes in a paved surface and the like, comprising:

a first assembly that includes

(a) a tube having first and second ends and being adapted to receive ambient material at its first end and expel heated material at its second end, said tube being generally linear and having a length in excess of about five feet;

(b) a receptacle for receiving a thermoplastic material in granular form and directing such material into a first heating station within the tube;

(c) an auger mounted for rotation within the tube, said auger including a spirally wrapped blade whose diameter is slightly less than the inner diameter of the tube, and the auger having a central supporting shaft which is supported by at least one bearing that is concentric with the tube;

(d) means for heating the exterior wall of the tube so as to bring the initially granular material in the tube to at least a semi-plastic state;

(e) drive means for rotating the auger at a controlled and relatively slow rate so as to progressively transport thermoplastic material through the tube; and

(f) means for adjusting operation of the heating means so as to achieve a temperature of at least 305° Fahrenheit within the tube and to maintain said temperature for about three minutes, whereby a sulphur-based material may be passed through the heating tube and reach the melting point of sulphur during said passage;

and further including

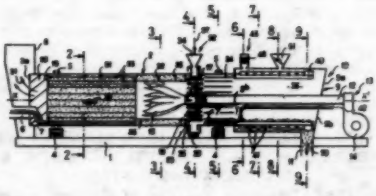
(g) a wheeled vehicle for supporting and transporting the first assembly over a paved surface to a work site, and further including auxiliary wheel means for rendering the first assembly mobile when it is separated from the wheeled vehicle, whereby the first assembly may be selectively separated from the wheeled vehicle and manually rolled to a desired location near the wheeled vehicle where the repair of chuck holes is required.

4,955,722

APPLIANCE FOR THE PREPARATION OF BITUMINOUS COATED PRODUCTS WITH A STATIONARY MIXER

Guy Marcounet, Rive de Gier, France, assignor to Ermont, C.M., Lorette, France

Filed Jun. 13, 1989, Ser. No. 365,381
Claims priority, application France, Jun. 13, 1988, 88 07857
Int. Cl.[5] B28C *5/14, 5/20*
U.S. Cl. 366—25 **5 Claims**



1. Apparatus for the preparation of bituminous coated products from virgin aggregate, liquid bitumen and recycled bituminous coatings, said apparatus comprising a cylindrical drum mounted for rotation about an axis of said drum and inclined slightly relative to a horizontal plane, a device for feeding cold and wet aggregates via an upper inlet end of said drum, a burner projecting into said drum at a lower outlet end of said drum, in such a way that hot gases coming from a flame of said burner and said virgin aggregates circulate in opposite directions, and comprising inside said drum, in sequence from its inlet end to it outlet end;

(a) an introduction zone where an inner surface of said drum is equipped with projecting blades arranged along helices coaxial with said drum;

(b) a drying zone in which said inner surface of said drum is equipped with lifting blades;

(c) a flame zone in which said inner surface of said drum is equipped with blades for retaining materials against said inner surface of said drum and into which opens an end of an elongate body of said burner;

(d) a zone for the introduction of recycled materials located in the vicinity of the end of said body of said burner form which a flame is generated, in which zone said drum is surrounded by a recycling ring and, in an inner part of said drum, is attached to a small drum coaxial with said drum and equipped on an inside of said small drum with lifting blades; and

(e) a zone for reheating recycled aggregates and blending said virgin aggregates and said recycled aggregates;

(f) the apparatus further comprising a mixer consisting of a stationary casing into which opens an outlet end of said drum and which is equipped with a means for injecting liquid bitumen and with a device for the removal of coatings, and mixing menas fastened to said drum and extending said drum axially in the directions of its outlet so as to enter said casing of said mixer, mixing being ensured by

rotation of said mixing means during rotation of said drum;

(g) said casing of said mixer delimiting around said body of said burner a mixing zone separated from said flame zone by said zone of introduction of recycled materials and by said zone for reheating said recycled aggregate and blending said virgin and recycled aggregates.

4,955,723

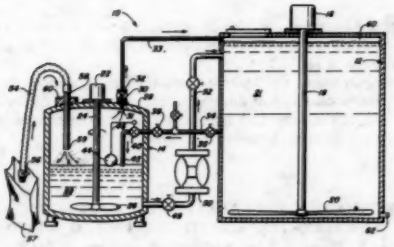
SLURRY MIXING APPARATUS WITH DRY POWDER CONVEYER

John R. Schneider, 26 Cove Rd., Belvedere, Calif. 94920

Filed Jan. 16, 1990, Ser. No. 465,432

Int. Cl.[5] B01F *15/02*

U.S. Cl. 366—136 5 Claims



1. An apparatus for combining powdered and liquid constituents to form a slurry, comprising:

a first tank for initially holding a quantity of liquid;

a second tank having an upper and a lower end;

a motor driven agitator within said second tank;

a first conduit extending from said first tank into said second tank;

valve means in said first conduit;

control means responsive to the liquid level in said second tank for closing said valve means when the liquid in said second tank reaches a predetermined maximum level, said maximum level being in said lower end of said second tank at a level which is substantially lower than its full volumetric capacity so that an open chamber is formed in said upper end above said maximum liquid level;

an opening in the upper end of said second tank;

a vacuum pump having an inlet attached to said opening and an outlet attached to the upper end of said first tank;

a third conduit connected from the lower end of said second tank to said first tank and a pump in said third conduit; and

powder conveying conduit means extending through said upper end of said second tank, said conveying conduit having a movable exterior section with an outer end opening and a fixed interior section within said second tank having an outlet extending slightly above said maximum liquid level; whereby a low pressure condition created within said open chamber above the maximum liquid level in said second tank causes an airstream in said conveying conduit which enables powdered material to be sucked into said second tank as mixing occurs with liquid therein to form a slurry.

4,955,724

FOOD PROCESSING MACHINE

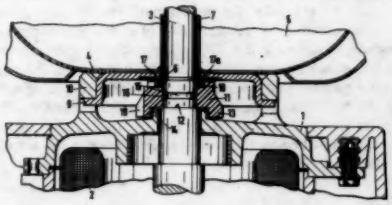
Friedrich Otto, Hamein, Fed. Rep. of Germany, assignor to A. Stephan u. Soehne GmbH & Co., Hamein, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,494

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 8809812[U]

Int. Cl.[5] B01F *7/16*

U.S. Cl. 366—314 4 Claims



1. A machine for the processing of foodstuffs or for the preparation of liquid or pasty pharmaceutical and chemical products comprising:

a bowl with a bottom having a shaft passage passing therethrough;

a motor having a motor shaft with a free end, a shoulder and an annular groove adjacent to said shoulder and located between said free end and said shoulder, wherein said motor shaft protrudes through said shaft passage perpendicularly to said bottom of said bowl;

a housing ring enclosing said motor shaft;

an O-ring disposed around said motor shaft within said annular groove;

a cap-shaped seal support with an upper section having a recess therein and a lower peripheral cap rim engaging in labyrinth fashion at a clear distance said housing ring; and

a V-ring seated in said recess in tight contact with said motor shaft and having an upper V-member and a lower V-member,

wherein said seal support is fitted around said motor shaft under said bowl such that said seal support surrounds said annular groove, rests on said shoulder and contacts said O-ring, and

wherein said upper V-member of said V-ring encloses said shaft passage in said bottom of said bowl and fits against the underside of said bottom of said bowl under axial stress.

4,955,725

LASER OSCILLATOR/AMPLIFIER WITH COMPENSATION FOR STRESS BIREFRINGENCE

Bertram C. Johnson, Sunnyvale, and Richard L. Herbst, Palo Alto, both of Calif., assignors to Spectra Physics, San Jose, Calif.

Continuation-in-part of Ser. No. 312,734, Feb. 17, 1989, abandoned. This application May 26, 1989, Ser. No. 358,714

Int. Cl.[5] H01S *3/10*

U.S. Cl. 372—22 23 Claims

1. An apparatus for generating a laser beam, comprising:

means for reflecting incident light along an optical path;

an oscillator gain medium characterized by a distribution of stress birefringence, mounted along the optical path for generating an oscillator beam along the optical path, the oscillator beam having a polarization distribution affected by the stress birefringence in the oscillator gain medium;

an output coupler mounted along the optical path so that the means for reflecting, the oscillator gain medium and the output coupler form a laser oscillator transmitting a component of the oscillator beam;

amplifying means, mounted along the optical path so that the output coupler is between the oscillator gain medium and the amplifying means, for amplifying light on the optical path to generate the laser beam, the amplifying means characterized by a distribution of stress birefringence; and

means, mounted along the optical path between the oscillator gain medium and the amplifying means, for rotating the polarization distribution in at least the component of the oscillator beam so that compensation for the effect of the stress birefringence in the oscillator gain medium is accomplished by the stress birefringence in the amplifying means.

4,955,726

PERFLUOROPOLYETHERS USED AS FLUIDS FOR TESTING IN ELECTRONIC FIELD

Giannangelo Bargigia; Gerardo Caporiccio; Claudio Tonelli; Luciano Flabbi, and Giuseppe Marchionni, all of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 854,785, Apr. 23, 1986, abandoned. This application May 16, 1988, Ser. No. 195,356

Claims priority, application Italy, Apr. 24, 1985, 20477 A/85

Int. Cl.[5] G01N *25/00*

U.S. Cl. 374—57 **1 Claim**

1. Method for carrying out Thermal Shock Tests which comprises:

(A) dipping the sample into a liquid perfluoropolyether having a molecular weight of at least 390, at a temperature between −75° and −55° C., and wherein said liquid is selected from the group consisting of the following seven classes:

$$A'O(\underset{\underset{CF_3}{|}}{CF-CF_2O})_m(CFXO)_n-A, \quad (1)$$

wherein X is equal to —F or $-CF_3$; A and A', equal to or different from each other, are $-CF_3$, $-C_2F_5$ or $-C_3F_7$; the units $CF(CF_3)CF_2O$ and CFXO are randomly distributed along the perfluoropolyether chain, m and n are integers, n being 0 or greater, and the m/n ratio being 2 when $n \neq 0$;

$$C_3F_7O(\underset{\underset{CF_3}{|}}{CF-CF_2O})_m-B, \quad (2)$$

wherein B is $-C_2F_5$ or $-C_3F_7$, and m is a positive integer;

$$[C_3F_7O(\underset{\underset{CF_3}{|}}{CF-CF_2O})_m-CF(CF_3)-]_2, \quad (3)$$

wherein m is a positive integer

$$A'O[CF(CF_3)CF_2O]_m(C_2F_4O)_n(CFXO)_q-A \quad (4)$$

wherein A and A', equal to or different from each other, are $-CF_3$, $-C_2F_5$ or $-C_3F_7$; X is —F or CF_3; and m, n and q are integers;

$$CF_3O(C_2F_4O)_p(CF_2O)_q-CF_3 \quad (5)$$

wherein p and q are integers equal to or different from each other, wherein the p/q ratio is between 0.5 and 2;

$$AO-(CF_2CF_2CF_2O)_m-A' \quad (6)$$

wherein A and A', equal to or different from each other, are $-CF_3$, $-C_2F_5$ or $-C_3F_7$, and m is an integer; and

$$DO-(CF_2CF_2O)_r-D' \quad (7)$$

wherein D and D', equal to or different from each other, are $-CF_3$ or $-C_2F_5$, and r is an integer; said perfluoropolyether when

$$\underset{\underset{CF_3}{|}}{CFCF_2O}$$

units are present show a kinematic viscosity lower than 8.5 cSt at 20° C. and a distillation loss not higher than 10% by weight of the total at 140° C. under atmospheric pressure and at least 90% at 260° C., whereas when

$$\underset{\underset{CF_3}{|}}{CFCF_2O}$$

units are absent show a kinematic viscosity lower than 18 cSt and a distillation loss not higher than 10% at 140° C. and at least 90% at 280° C.

(B) extracting the sample from the perfluoropolyether of operation (A) and dipping it into a second liquid consisting of the same perfluoropolyether as in operation (A) at a temperature between 125° and 210° C.

4,955,727

METHOD AND APPARATUS FOR A NON-CONTACT MEASURING OF A TEMPERATURE OF A BODY

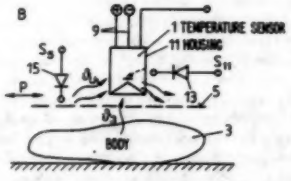
Hardy P. Weiss, Hütter, Switzerland, assignor to Martin Lehmann, Wohlen, Switzerland

Continuation of Ser. No. 64,464, Jun. 22, 1987, Pat. No. 4,887,229. This application Aug. 22, 1989, Ser. No. 396,913

Claims priority, application Switzerland, Jun. 20, 1986, 2503/86

Int. Cl.[5] G01J *5/24, 5/62*

U.S. Cl. 374—124 **23 Claims**



1. A temperature measuring apparatus for a non-contact measurement of a temperature of a body, said apparatus comprising:

a first temperature sensor means, having an input for receiving heat radiation, for generating an output signal dependent on heat radiation received from a direction towards said body;

a heat radiation chopper means, disposed in front of said heat radiation receiving input of said first temperature sensor means located between said body and said first for chopping said heat radiation; and

at least one second temperature sensor means arranged in an area adjacent said heat radiation chopper means and said

first temperature sensor means, said area being disposed on a same side of said chopper means as said first temperature sensor means;

wherein said second temperature sensor means generates a signal dependent on a temperature in said area; and

wherein said output signal generated by said first temperature sensor is dependent on a temperature of said body and said signal generated by said second temperature sensor means is used for influencing said output signal to reduce its dependency on said temperature in said area.

4,955,728

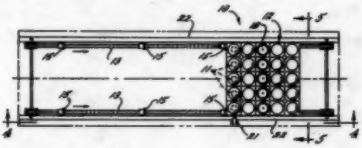
METHOD AND APPARATUS OF DISTINGUISHING BETWEEN LIVE AND DEAD POULTRY EGGS

John H. Hebrank, Durham, N.C., assignor to Embrex, Inc., Research Triangle Park, N.C.

Filed Jan. 23, 1990, Ser. No. 468,924

Int. Cl.[5] G01K *13/06, 7/02, 7/22;* **G01J** *5/00*

U.S. Cl. 374—124 **7 Claims**



1. An apparatus for using infrared radiation to distinguish between live and dead poultry eggs, and comprising:

a plurality of infrared radiation sensors;

means for moving a fixed array of eggs to a predetermined aligned position with respect to the infrared sensor;

means for recording the infrared radiation emitted by each egg in the fixed array;

means for calculating a threshold temperature from the individual temperatures for which 70 percent of the eggs measured in the fixed array are cooled; and

means for removing dead eggs from the fixed array which are identified as having temperatures more than one degree Fahrenheit cooler than the threshold temperature.

4,955,729

HEARING AID WHICH CUTS ON/OFF DURING REMOVAL AND ATTACHMENT TO THE USER

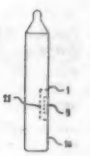
Günter Marx, G.-Caracciola-Strasse 10, 8035, Gauting, Fed. Rep. of Germany

Filed Mar. 29, 1988, Ser. No. 174,689

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 8704763[U]; May 14, 1987, 3716162[U]; Dec. 16, 1987, 3742529

Int. Cl.[5] H04R *25/00*

U.S. Cl. 381—68 **24 Claims**



1. A hearing aid; comprising:

amplifying means including an amplifier for boosting an incoming signal;

a power source operatively electrically connected to said amplifier; and

switching means for automatically controlling the electrical connection between said amplifier and said power source by automatically providing the electrical connection upon attachment of the hearing aid to the user and by automatically breaking the electrical connection when the hearing aid is detached from the user, said switching means including a switch responsive to a change of temperature and being arranged on the hearing aid at a location which is subjected to the change of temperature, said switch being a temperature-sensitive switch in heat-conducting connection with the skin of the user at said location when the hearing aid is mounted to the user.

4,955,730

OIL-PRESSURE BEARING APPARATUS

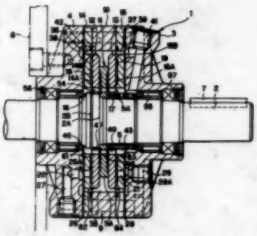
Mitsuhiro Kashima, and Kensei Suzuki, both of Kani, Japan, assignors to Kayaba Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,590

Claims priority, application Japan, Dec. 5, 1988, 63-158199; Dec. 5, 1988, 63-158200; Aug. 22, 1989, 1-215613

Int. Cl.[5] F16C *32/06*

U.S. Cl. 38.4—101 **7 Claims**



1. An oil-pressure bearing apparatus comprising;

a rotating shaft which receives thrust loads

a pair of bearing housings which support said rotating shaft;

a pair of floating discs which are installed on said rotating shaft;

a plurality of rolling components which are installed between said pair of floating discs;

a plurality of pressurized chambers and clearances formed between external surfaces of said pair of floating discs and said pair of bearing housings so that said pressurized chambers and clearances can be positioned in the periphery of said rotating shaft;

an oil-supply passage which links said pressurized chambers to an oil-pressurizing source; and

an oil-feedback passage which links said pressurized clearances to an oil tank.

4,955,731

BEARING EQUIPMENT FOR VACUUM DEVICES

Akira Yamamura, Tokyo, Japan, assignor to Nippon Ferrofluidics Corporation, Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 344,651

Int. Cl.[5] F16C *17/10*

U.S. Cl. 384—133 **2 Claims**

1. A bearing device for a vacuum device comprising:

first and second generally annular pole pieces;

a permanent magnet member having an annular shape fitted between said first and second annular pole pieces;

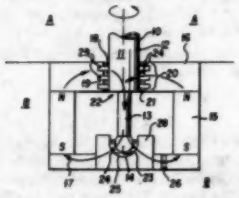
said first annular pole piece having a plurality of ring members formed on an inner surface thereof and an aperture formed centrally therein;

said second annular pole piece having a portion thereof formed into a concave spherical shape;

a rotatable shaft member having first and second portions;

said first portion having a larger diameter for fitting through the aperture formed in the first annular pole piece

said second portion having an end part formed into a partially spherical shape to mate with the concave spherical shape formed in second annular pole piece;



magnetic fluid means disposed intermediate the said mated spherical shapes and opposite said ring portions of said first annular pole piece.

4,955,732

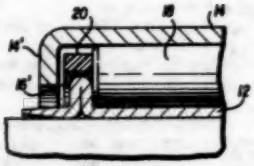
UNITARY, AXIALLY SELF-LOCATING NEEDLE BEARING

Mark B. Behrens, Charlotte, N.C., assignor to INA Bearing Company, Fort Mill, S.C.

Filed Apr. 12, 1989, Ser. No. 336,790

Int. Cl.[5] F16C *33/58*

U.S. Cl. 384—484 **16 Claims**



1. A drawn shell, axially shelf-locating needle bearing comprising:

a drawn inner race having a flange projecting radially outwardly from said inner race;

a drawn outer race having a flange projecting radially inwardly at either end of said outer race;

a plurality of needle rollers held in a cage contained between said drawn inner race and said drawn outer race; and

means for axially locating said inner race with respect to said outer race, said axial locating means comprising said radially outwardly projecting flange of said inner race positioned between one end of said needle rollers, and one of said inwardly projecting flanges of said outer race, and the other inwardly projecting flange of said outer race positioned at the other end of said needle rollers, wherein said inner race is drawn from sheet stock and said flange on said inner race is a crimped portion of said sheet stock.

4,955,733

PRINTING APPARATUS WITH EXPANDED PITCH MODE AND UNDERLINING

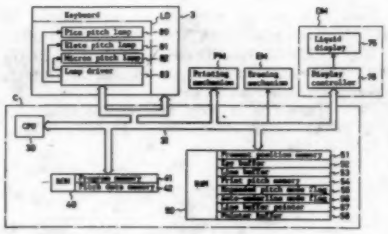
Tsutomu Ukon, Kuwana, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 7, 1989, Ser. No. 319,701

Claims priority, application Japan, Mar. 14, 1988, 63-61336

Int. Cl.[5] B41J *29/26*

U.S. Cl. 400—17 **7 Claims**



1. A printing apparatus comprising;

an entering means for entering data of characters and various command signals,

a line buffer for storing data entered from said entering means,

a printing means for printing characters along a print line corresponding to data entered into said line buffer on a printing medium,

an underline mode setting means for setting an underline mode in which said characters are printed with underlines,

a pitch setting means for setting one of plural print pitches,

an expanded pitch setting means for setting an expanded pitch mode in which an expanded space is provided between entered neighboring characters in said print line so that the pitch between neighboring characters is an integer multiple greater than 1 of said print pitch set by said pitch setting means, and

an underline print control means for controlling said printing means to print one or more underlines in said expanded space between a preceding printed characters and a succeeding character to be printed before printing of said succeeding character when the data of said succeeding character is entered, when both said underline mode and said expanded pitch mode are set.

4,955,734

INFORMATION PROCESSING APPARATUS

Shinichiro Nakazawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 185,276, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 902,108, Aug. 29, 1986, abandoned, which is a continuation of Ser. No. 640,742, Aug. 14, 1984, abandoned. This application Jan. 17, 1990, Ser. No. 463,821

Claims priority, application Japan, Aug. 18, 1983, 58-149676

Int. Cl.[5] B41J *5/30*

U.S. Cl. 400—63 **10 Claims**

1. An information processing apparatus comprising:

input means for entering a plurality of character strings including a character string to be corrected;

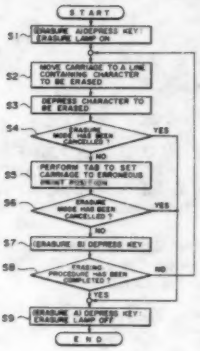
memory means connected to said input means for storing

therein the plurality of character strings entered by said input means;

printing means for printing the character string stored in said memory means;

search instruction means for instructing a search of the character string to be corrected;

search means for searching in said memory means for a



character string which is the same as the character string input by said input means and to be corrected, in response to an instruction of said search instruction means;

tab position set means for setting a tab to a position of the character string searched by said search means; and

control means for positioning said printing means at a tab position set by said tab position set means so as to be capable of printing a new character string.

4,955,735

PRINTER WITH COMBINED DATA AND OPERATING-MODE DISPLAY

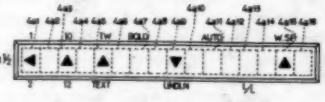
Shoji Sakuragi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Mar. 7, 1989, Ser. No. 319,702

Claims priority, application Japan, Mar. 17, 1988, 63-64083

Int. Cl.[5] B41J *3/46*

U.S. Cl. 400—83 **8 Claims**



1. A printer having input-display means for displaying data from a keyboard on a display panel and mode-executing means for executing at least one mode chosen from a set of many operating modes, the printer comprising:

the display panel having a single line of discrete display segments;

marks arranged above, below, and/or on at least one side of the display panel and placed adjacent to one of the discrete display segments, each mark representing a different operating mode; and

mode-displaying means for overriding the input display means so that no input data is displayed on said single line of discrete display segments and for displaying only operating modes on the display panel by indicating marks corresponding to currently selected operating modes executed by the mode-executing means when a dedicated key on the keyboard is pressed;

wherein the mode-display means displays operating modes by displaying an indication character in display segments adjacent to the marks corresponding to the operating modes to be displayed, each indication character selectively pointing to one of the marks corresponding to a currently selected operating mode.

4,955,736

METHOD AND APPARATUS FOR ENERGIZING THERMAL HEAD IN ACCORDANCE WITH DOT PATTERN COINCIDENCE TABLES

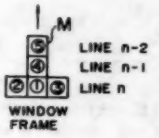
Satoshi Iwata; Akikazu Toida, and Fumio Takahashi, all of Ise, Japan, assignors to Shinko Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,157

Claims priority, application Japan, Feb. 15, 1988, 63-30769; Feb. 23, 1988, 63-38668

Int. Cl.[5] B41J *3/20*

U.S. Cl. 400—120 **5 Claims**



1. A method for energizing a thermal head of a thermal printer comprising the steps of:

storing a plurality of lines of dots of printing data supplied from an external equipment in a plural line buffer;

extracting a predetermined number of dots on said plurality of lines in accordance with a window frame of a predetermined shape by scanning the printing data sequentially;

generating an address representing the predetermined number of dots extracted by said window frame;

determining whether the address corresponds to a predetermined window frame pattern or not;

converting both the address corresponding to said predetermined window frame and the address not corresponding thereto into intermediate codes by an intermediate code table, said intermediate codes respectively representing different amounts of heating energy to be supplied to a corresponding heating element of said heating unit depending on whether the address represents a printing area or non-printing area in the case the coincidence with said predetermined window pattern is determined, and whether the address represents a printing area or a non-printing area in the case the coincidence with the predetermined window pattern is not determined; and

energizing the heating element of the heating unit in response to the intermediate code for the number of times to reach the amount of heating energy designated by the intermediate code.

4,955,737

HOLDER FOR A RIBBON FOR TYPEWRITERS OR SIMILAR MACHINES

Johannes Haftmann, Schwabach, and Werner Haczek, Furth, both of Fed. Rep. of Germany, assignors to Ta Triumph Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,486

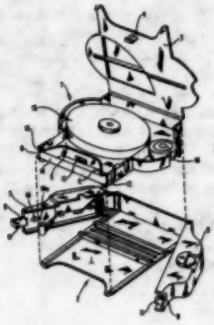
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1987, 37413635

Int. Cl.[5] B41J *32/00*

U.S. Cl. 400—208 **2 Claims**

1. A holder for a ribbon for typewriters or similar machines where the holder is insertable into a receptacle, comprising a

slider having a hook on a free end thereof, the slider being disposed on each one of two pivotable side elements of the



receptacle, and which, in its operational position, hooks the holder to the receptacle.

4,955,738

PRINTER WITH DISENGAGEABLE RIBBON FEED

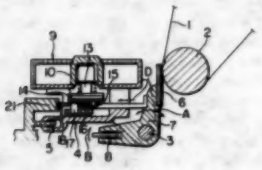
Yoshio Uchikata; Mineo Nozaki, both of Kawasaki; Osamu Asakura, Tokyo, and Masasumi Nagashima, Yokosaka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 880,111, Jun. 30, 1986, abandoned, which is a continuation of Ser. No. 630,187, Jul. 12, 1984, abandoned. This application Jun. 6, 1988, Ser. No. 203,503

Claims priority, application Japan, Jul. 20, 1983, 58-130981; Jul. 20, 1983, 58-130983

Int. Cl.[5] B41J *33/04*

U.S. Cl. 400—229 **13 Claims**



1. A printer for effecting image recording on a recording medium by using an ink ribbon moved by a winding portion, the printer comprising:

a platen;

a carriage movable along a conveyance route of the recording medium and having a mounting portion for mounting the ink ribbon thereon;

a mounting portion, coupled to said carriage, for mounting the ink ribbon;

a thermal head on said carriage, said thermal head being movable relative to said carriage and relative to said mounting portion between a record position for effecting image recording on the recording medium and a withdrawn position displaced from the record position;

an engaging member disposed along the path of said carriage;

a rotary member for engaging said engaging member to obtain a drive force for moving the ink ribbon as said carriage moves along said platen;

transmission means for transmitting the drive force to the winding portion to move the ink ribbon; and

displacing means for moving said engaging member between an engaging position, wherein said engaging member engages said rotary member, and a withdrawn position, wherein said engaging member is withdrawn from the engaging position.

4,955,739

MECHANICAL PENCIL HAVING SIDE PUSH BUTTON ACTUATED LEAD ADVANCE

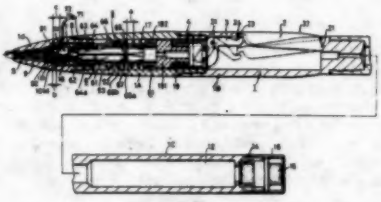
Hidebei Kageyama; Yoshihide Mitsuya, and Youichi Nakazato, all of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

Filed Oct. 21, 1988, Ser. No. 261,244

Claims priority, application Japan, Oct. 23, 1987, 62-266630

Int. Cl.[5] B43K *21/16*

U.S. Cl. 401—65 **4 Claims**



1. A mechanical pencil comprising:

an outer cylinder having upper and lower ends and including means for housing a plurality of leads;

an outer sleeve disposed within said outer cylinder;

lead move-out means, disposed within said outer cylinder and in contact with said outer sleeve, for feeding one of said plurality of leads out through said lower end of said outer cylinder upon downward movement of said outer sleeve;

a side pushing hole formed in a side of said outer cylinder;

a pushing member positioned within said side pushing hole and having upper and lower ends, said lower end of said pushing member being slidable in said side pushing hole between first and second positions, said upper end of said pushing member including a pivot point about which said pushing member pivots when said lower end of said pushing member is moved between said first position and said second position; and

lever means, pivotally mounted within said outer cylinder and in contact with said lower end of said pushing member and with said outer sleeve, for pressing said outer sleeve downwardly upon movement of said lower end of said pushing member from said first position to said second position, said lever means including a first leg which contacts said lower end of said pushing member and a second leg which contacts said outer sleeve, said second leg being bifurcated so as to form a passage through which leads can pass,

wherein said pushing member and said lever means are disposed longitudinally between said lead move-out means and said lead housing means and are adapted to cooperate with each other for changing movement of said pushing member into movement of said outer sleeve.

4,955,740

WELDED JOINT BETWEEN PLASTIC PARTS

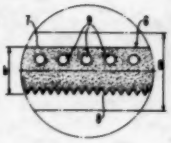
Rainer Renz, Stuttgart, and Karl-Heinz Ilzhoefer, Reichenbach-/Fils, both of Fed. Rep. of Germany, assignors to Daimler Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jan. 4, 1988, Ser. No. 140,588

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1987, 3700465

Int. Cl.[5] B25G *3/00*; F16B *1/00*

U.S. Cl. 403—27 29 Claims



1. Welded joint between plastic parts, wherein at least one of the plastic parts to be welded together is provided with a jointly weldable coating of an X-ray contrast medium containing coloring pigments based on heavy metals, and having a sharply set-off outer contour and a specific outline shape, said coating being disposed in the region of the surface in contact with the other plastic part at the welded joint.

4,955,741

UNIVERSAL JOINT

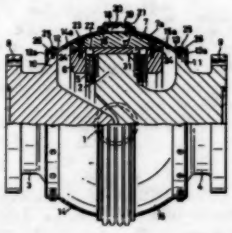
Nobuo Komeyama, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Mar. 28, 1989, Ser. No. 329,740

Claims priority, application Japan, Mar. 30, 1988, 63-43437

Int. Cl.[5] F16B *7/10*, *3/00*

U.S. Cl. 403—57 8 Claims



1. A universal joint including a pair of yokes each having two trunnions projecting radially thereof, and an annular intermediate ring having bearings arranged on two diametrical lines thereof intersecting each other at right angles for supporting the respective trunnions of the yokes, the universal joint comprising an annular central cover fixedly intimately fitted around the intermediate ring and having a spherical outer surface, a collar formed on each of the yokes and positioned between the intermediate ring and a connecting flange at the outer end of the yoke, a pair of annular side covers each having an outer end portion of horizontal section fixed to the periphery of the collar in intimate contact therewith and a spherical inner surface slidable in contact with the spherical outer surface of the central cover, and an annular seal member provided at the inner end portion of each of the side covers and in intimate contact with the outer surface of the central cover, the inner ends of the pair of side covers being spaced apart from each other by a clearance required for the sliding movement of the side covers, the connecting flange being so sized as to permit the side cover to pass thereover.

4,955,742

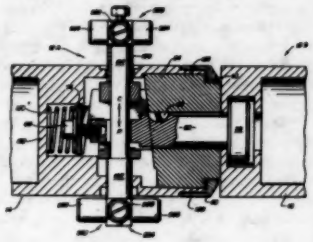
ERECTABLE STRUCTURE TRUSS ATTACHMENT JOINT

Geoff Marks, Santa Barbara, Calif., assignor to Astro Aerospace Corp., Carpinteria, Calif.

Continuation of Ser. No. 52,237, May 19, 1987, abandoned. This application Nov. 22, 1989, Ser. No. 441,232

Int. Cl.[5] B15G *3/00*

U.S. Cl. 403—246 42 Claims



41. A joint for joining first and second members comprising:

a wall carried by the first member;

a piston carried by the second member and having a wall-abutting face and a shoulder;

a flange mounted to the second member and having a shoulder-abutting surface; and

means for applying a preload between the wall an the wall-abutting face of the piston and between the shoulder of the piston and the shoulder-abutting surface of the flange.

4,955,743

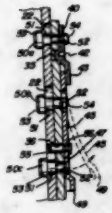
RACK BEAM LATCH

John R. King, West Bloomfield, Mich., assignor to S&K Enterprises, Inc., Detroit, Mich.

Filed Nov. 3, 1989, Ser. No. 431,388

Int. Cl.[5] B25G *3/00*; F16B *9/00*

U.S. Cl. 403—254 11 Claims



1. A rack beam latch for securing the end of a generally horizontally arranged beam to a vertical support post having a series of similar, vertically aligned, pin receiving openings formed therein, with the beam end having an end plate which overlaps some of the openings, and with pins formed on the end plate and extending into said openings for connecting the beam to, and for supporting the beam upon, the support post, and with the pin receiving openings being vertically elongated and having upper portions that are widened relative to their lower, narrowed portions and the pins being formed to loosely fit through the opening upper portions for insertion and re-

moval therefrom, but formed to be closely fitted and held within the lower portions of the openings to prevent removal therefrom; said latch comprising:

an upper, sheet-like cover member positioned upon said end plate and having an upper portion fastened to the end plate and an integral lower portion bent a short distance from and arranged parallel to the end plate to form a space therebetween, so as to have said cover member in it entirety immovable relative to the plate;

a lower sheet-like spring member overlapping the plate and having an upper part snugly fitted within said space and an integral lower part extending below the upper cover member, and including means for positioning the spring member to the plate;

a latching protuberance provided on the lower part of the spring member and extended through a latching hole formed in the plate for extending into one of the support post pin receiving openings above a pin received in that opening, to prevent movement of that pin from the narrowed portion to the widened portion of the opening;

the lower part of said spring member being manually resiliently bendable away from the portion of the plate which it overlaps for moving the latching protuberance endwise out of said post opening for allowing the pin in that post opening, as well as other pins on the plate which are fitted in adjacent openings, to be manually removed upwardly into the widened portions of their respective openings for endwise removal therefrom, but otherwise the latching protuberance restrains the pins from movement out of the narrowed portions of their openings.

4,955,744

CLAMPING FIXTURE FOR AXIALLY CLAMPING A TOOL IN PLACE, IN PARTICULAR A DISC

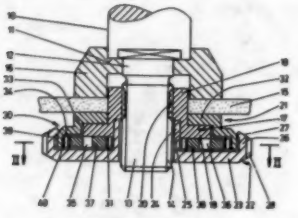
Walter Barth; Friedrich Hüsslein; Winfried Helm, and Manfred Stähler, all of Leinfelden-Echterdingen, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 14, 1989, Ser. No. 372,350

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3700968

Int. Cl.[5] B25G *3/00*

U.S. Cl. 403—259 **34 Claims**



1. A clamping fixture for axially clamping a tool, in particular a disc tool, on a flange of a driven spindle having an end portion with an outer thread, said clamping fixture comprising a clamping nut having an internal thread to be screwed on the end portion with an outer thread of the driven spindle; a clamping member arranged between the tool and said clamping nut for transmitting an axial clamping force to the tool upon tightening of said clamping nut; a manually operable adjusting member freely rotatable relative to the end portion of the driven spindle; and a gearing for gear-coupling said adjusting member to said clamping nut and gear-coupling said clamping nut to said clamping member, said gearing being arranged between said adjusting member and said clamping member and being formed as a planetary gear.

4,955,745

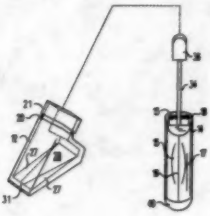
BOTTLE WITH APPLICATOR

Jeri A. Vanquelin, 1742 S. Bentley Ave., #302, Los Angeles, Calif. 90025

Filed Oct. 5, 1989, Ser. No. 417,434

Int. Cl.[5] A45D *34/00*; A46B *11/00*

U.S. Cl. 401—119 **20 Claims**



1. A new and improved bottle with applicator for use with nail polish, comprising:

a bottle;

said bottle having an inclined exterior front wall;

a flat exterior bottom surface;

said exterior front wall forming an angle of about 45 degrees with said exterior bottom surface;

an interior front wall extending parallel to said exterior front wall;

an interior bottom surface inclined downwardly toward said interior front wall and forming an angle with said exterior bottom surface;

said interior bottom surface formed from three intersecting inclined planar surfaces, two of said inclined planar surfaces inclined downwardly and inwardly toward said interior front wall;

an exterior back wall surface obliquely angled with respect to said exterior front wall surface and forming an acute angle with said exterior bottom surface;

a generally rectangular top wall portion connected to said exterior front wall and said exterior back wall;

first sealing means on said top wall portion;

a cap having second sealing means for cooperating with said first sealing means; and

an applicator attached to said cap.

4,955,746

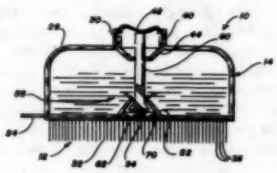
PORTABLE CLEANING DEVICE FOR GOLF CLUBS

Joseph M. Craigmile, 1003 N. Cooper, Columbia, Mo. 65203

Filed Aug. 3, 1989, Ser. No. 389,176

Int. Cl.[5] A46B *11/04*

U.S. Cl. 401—131 **8 Claims**



1. A portable cleaning device for golf clubs adapted to be held in a palm of a user's hand comprising a reservoir for containing cleaning fluid, a scrubbing brush means attached to the bottom of the reservoir and a valve means for controlling the flow of the cleaning fluid into the scrubbing brush means, said reservoir having a base, sidewalls and a generally rigid

closed top with an opening closed with a removable cap which is resiliently biased in a direction away from the base but which is flexible such that it can be flexed in a direction towards the base by the user, said valve means having means for discharging the cleaning fluid in a substantially undivided stream and comprising a valve housing flowably connected with an opening formed in the base of the reservoir with a valve seat above the opening into which is seated a valve head, said valve head having a valve stem and a resilient biasing means positioned on the opposite side thereof, said valve stem having one end secured to the valve head and the other end juxtapositioned relative to the cap such that the valve stem is displaced in the direction of the base when the removable cap is flexed displacing the valve head from the valve seat and allowing cleaning fluid to flow from the reservoir into the scrubbing means and said resilient biasing means bearing against the valve head such that the valve head is normally seated in the valve seat stopping the flow of cleaning fluid from the reservoir.

4,955,747

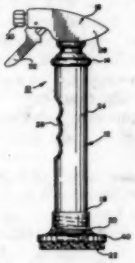
APPLICATOR AND POLISHING DEVICE

Matthew A. Tarver, 341 S. Wolf Rd., Des Plaines, Ill. 60016

Filed Nov. 27, 1989, Ser. No. 441,280

Int. Cl.[5] A47L *13/30*

U.S. Cl. 401—139 **32 Claims**



1. A hand-held device for removably holding a working pad comprising:

(a) a container for holding a fluid having at least one open upper end, a closed lower end and a gripping portion;

(b) means for dispensing the fluid on a surface, the dispensing means being removably secured to the upper end of the container in communication with the fluid in the container; and

(c) means for removably securing the working pad about the lower end of the container so that only the working pad contacts the surface when the working pad is compressed against the surface, the lower end of the container including an externally threaded portion adapted to threadably engage the securing means, the securing means including a threaded portion defined thereon,

whereby the gripping portion permits the user to hold the container comfortably during operation of the dispensing means or the working pad.

4,955,748

DUSTLESS DRYWALL FINISHER

Robert Krumholz, 138 Park Ave., Garden City Park, N.Y. 11040

Filed Jul. 26, 1989, Ser. No. 385,200

Int. Cl.[5] A46B *11/00*; B43K *5/00*

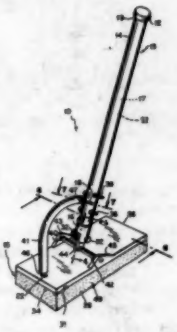
U.S. Cl. 401—140 **3 Claims**

1. A dustless drywall finisher, comprising:

(a) a rigid handle portion containing a liquid, a hollow free end, a fixed end, a plastic plug, and a rubber cap disposed at said free end, said liquid being water, and said rigid handle portion having said plug mounted to said fixed end of said rigid handle portion, said plug consisting of a body being substantially cylindrical in shape and containing a pair of extensions emanating therefrom, said pair of extensions containing a pair of diametrically opposed holes containing a pair of bolts, respectively, said rigid handle portion containing a rigidly affixed internal valve, said internal valve being internally attached within said rigid handle portion;

(b) a sponge portion support on a platform head is pivotally mounted to said rigid handle portion and said rigid handle portion contains a rigid tube that is made of aluminum so that said rigid handle portion will not oxidize;

(c) means for transporting said liquid from said rigid handle portion to said sponge portion so that said sponge portion and said rigid handle portion still remain mututally pivot-



able with regards to each other and allows said liquid to prevent the formation of airborn dust, said means including a hollow flexible tube that has a first end and a second end, said first end being connected to an "L"-fitting disposed on said sponge portion while said second end is connected to said valve so that when said valve is opened said fluid will pass from said rigid tube of said rigid handle portion through said valve, through said flexible tube, and into said "L"-fitting of said sponge portion; and

(d) a "tee" fitting containing a transverse arm and a longitudinal arm which pivotally connects said handle portion to said sponge portion by having said longitudinal arm pass between said pair of extensions and said bolts tightening dowon on said longitudinal arm and holding it in position.

4,955,749

SWIVEL CONNECTOR

Vlatko Panovic, Suite 2404, 4221 Mayberry St., Burnaby, British Columbia, Canada V5H 4E8

Filed Jun. 19, 1989, Ser. No. 367,629

Int. Cl.[5] B25G *3/00*

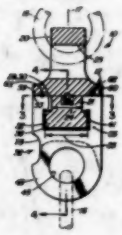
U.S. Cl. 403—11 **14 Claims**

1. A swivel connector comprising:

(a) a plug connector portion having a first body member having an outer portion, a neck portion and a head portion, the outer portion having an eye to receive a first link, the neck portion having a diameter less than the head portion and being concentric therewith about a longitudinal axis to provide a shoulder having a first bearing surface,

(b) a socket connector portion having second and third body members, each body member having a longitudinally aligned main face having a recess which is generally complementary to one half of the neck and head portions of the first body member to accept the said one half therein, each recess having a semi-annular bearing surface positioned to engage a corresponding half of the first bearing

surface of the first body member when the main faces of the second and third body members are abutted to form a unit to enclose the neck and head portions of the first body member, the second and third body members each having a respective outer portion with a respective eye so that when the second and third body portions cooperate with each other as the said unit, the eyes thereof are aligned with each other to receive a second link passed therethrough,



(c) force generating means on at least one bearing surface for generating an inwards force on the second and third body members, which force is directed towards the longitudinal axis and tends to hold the second and third body members together,

(d) resilient means for applying an initiating force between the connector portions so as to force the complementary bearing surfaces into engagement with each other to generate the said inwards force.

4,955,750

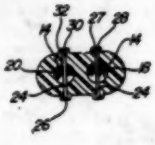
ROPE FASTENER

Leo Goran, P.O. Box 1074, Punta Gorda, Fla. 33951-1074

Filed Sep. 5, 1989, Ser. No. 402,542

Int. Cl.[5] B25G *3/00*; F16B *7/10*

U.S. Cl. 403—306 14 Claims



1. A rope fastener comprising:

a body portion of a resilient material;

said body portion having at least one passage of a size to receive a rope therein, said passage extending longitudinally through said body portion;

said body portion having at least one nail receiving hole transverse to said at least one passage and extending diametrically across said passage and through said body on opposite sides of said passage; and

at least one nail for insertion into said at least one nail hole to extend diametrically through the rope in said at least one passage to retain said rope in said passage, said nail extending into said body portion on the opposite side of said body portion from where said nail is inserted into said body portion, said nail and said nail receiving hole being sized so that said resilient body portion is deformed by said nail to retain said nail therein.

4,955,751

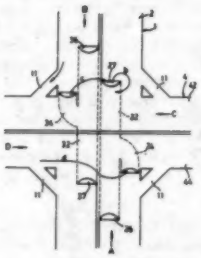
CROSSROAD WITHOUT TRAFFIC LIGHTS

John Tsai, No. 3, Lane 541, Fu Hsing Rd., Hsi Tun Chu, Taichung City, Taiwan

Filed Aug. 22, 1989, Ser. No. 396,861

Int. Cl.[5] E01C *1/00*

U.S. Cl. 404—1 4 Claims



1. A crossroad comprising:

a first road being substantially level and straight;

a second road intersected with said first road;

a first pair of second dimensional passages being provided on said second road, each of said first passages having a bypass merging into one side thereof;

each of said first passages having a first entrance at one end and a first exit at the other end;

each of said first entrances being spaced further from said first road than said first exit on the same side of said first road;

each of said bypasses having an inlet adjacent to said first road and closer to said first road than said first exit on the same side of said first road;

wherein a vehicle driving into said first entrance and out of said first exit of one of said first passages is movable over said first entrance of the other said first passage for making a left turn, and movable into said inlet of said bypass of the other said first passage for making a U-turn.

4,955,752

COVER ASSEMBLY WITH A LOCKING MECHANISM

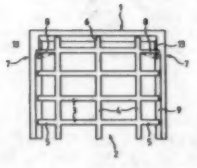
Derek Ferns, Gwent, Great Britain, assignor to Van Roll AG, Gerlafingen, Switzerland

Continuation of Ser. No. 149,752, Jan. 29, 1988, Pat. No. 4,909,660. This application Oct. 16, 1989, Ser. No. 421,818

Claims priority, application United Kingdom, Feb. 2, 1987, 87 02221; Feb. 5, 1987, 87 02585

Int. Cl.[5] E01C *11/22*

U.S. Cl. 404—2 9 Claims



1. A cover assembly for closing an opening, comprising a dimensionally stable and rigid frame; a substantially rigid covering mounted in said frame in a non-prestressed position; and locking means arranged on said frame and said covering for detachably-securing said covering against displacement or removal from said frame, said locking means including at least

one elastically deformable closing member made integrally with said covering so as to form a one-piece covering and extending substantially in a plane thereof, and at least one rigid retaining member formed on said frame, said closing member including an elastically deformable rod-like web having a closing finger elastically bendable in the plane of said covering, said retaining member being provided with a groove engaging said closing finger for a positive securing of said covering to said frame.

4,955,753

ROADWAY BARRIER SYSTEM

Alan R. McKay, 1126 Hilltop Dr., Lafayette, Calif. 94549

Continuation-in-part of Ser. No. 220,926, Jul. 18, 1988, Pat. No. 4,881,845, which is a continuation of Ser. No. 815,456, Jan. 2, 1986, abandoned. This application Nov. 17, 1989, Ser. No. 438,763

Int. Cl.[5] E01F *13/00*

U.S. Cl. 404—6 **16 Claims**

1. A roadway barrier system which provides a safe separation between opposing lanes of vehicular traffic and is capable of being moved across a lane to change the direction of traffic flow in the lane, comprising: a plurality of elongated barrier sections positioned end-to-end along one side of the lane, a vehicle which travels along the lane having a transfer beam in the form of a closed loop with a portion of the beam extending diagonally across the lane, and a plurality of trolleys mounted on the transfer beam for movement around the loop and into lifting engagement with successive ones of the barrier sections for carrying the barrier sections across the diagonally extending portion of the beam from one side of the lane to the other as the vehicle travels along the lane.

4,955,754

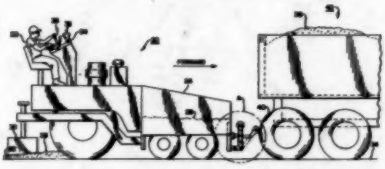
SHOCK ABSORBING DEVICE FOR A PAVING MACHINE

Donald W. Smith, Aurora, Ill., assignor to Barber-Greene Company, DeKalb, Ill.

Filed Jan. 19, 1990, Ser. No. 467,640

Int. Cl.[5] E01C *19/18*

U.S. Cl. 404—108 **24 Claims**



1. A device for cushioning a contact between a travelling self-propelled paving machine equipped with a hopper for receiving paving material and a truck carrying paving material to be deposited in the hopper, the truck being equipped with a tire, the device comprising:

A. contacting means, connected to the paving machine, for contacting the truck and for applying to the truck a force tending to move the truck in a direction in which the paving machine is travelling, the contacting means movable between an extended position for initially contacting the truck and a retracted position;

B. cushioning means, connected to the contacting means and to the paving machine, for cushioning the force applied to the truck and the force applied to the paving machine by the contact between the contacting means and the truck;

C. latch means, connected to one of the paving machine and the contacting means, for latching the contacting means in the retracted position, the latch means having a latched state and an unlatched state; and

D. restoring means, connected to the contacting means and to the paving machine, for restoring the contacting means to the extended position.

4,955,755

DEVICE FOR THE IN SITU REPAIR OF A PIPE

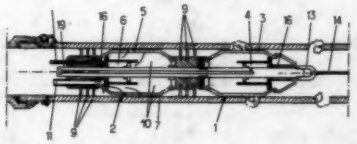
André F. Frey, 295 Rue du Général LeClerc, 57560 Abreschviller, France

Filed Jun. 9, 1989, Ser. No. 364,821

Claims priority, application France, Jun. 10, 1988, 88 07973

Int. Cl.[5] F16L *55/16*

U.S. Cl. 405—155 **12 Claims**



1. A device for the in situ repair of a pipe by the injection under pressure of a sealing product, which device comprises a front module and a rear module and wherein:

each module includes radially displaceable arms and hydra displacement means, connectable to an hydraulic pump at surface level, for displacing the arms;

the arms are displaceable between an inoperative, radially retracted position and an operative, radially distended position, whereby the front module, through pressure exerted by its arms on the damaged inside walls of the pipe, can act both as a widener and as a guide, to restore the pipe to its original diameter and to facilitate passage along the pipe of the rear module;

the rear module includes, at each opposite end thereof, sealing means which, in conjunction with the pipe, define a chamber into which leads at least one passage for feeding sealing product, the passage being connectable to a pump for sealing product at surface level; and said radially displaceable arms of the rear module being disposed between the sealing means.

4,955,756

PIPELINE PADDING SYSTEM

Ed Klamar, 320 N. 7th St., Indiana, Pa. 15701

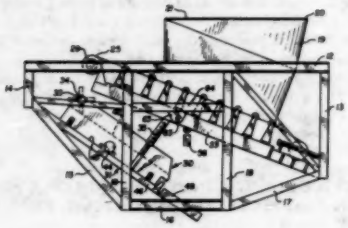
Continuation-in-part of Ser. No. 200,743, May 31, 1988. This application Aug. 11, 1989, Ser. No. 392,503

Int. Cl.[5] E02F *5/22*

U.S. Cl. 405—179 **9 Claims**

1. Apparatus for covering pipe laid in a trench comprising an elongated chassis adapted to be mounted on carriage means movable along the trench, a backfill hopper supported by said chassis at one end, a conveyor adapted to carry backfill from said hopper discharge to an elevation above said hopper discharge at the other end of the chassis, a vibrating screen receiving backfill material discharged from said conveyor and delivering backfill material of padding size at said other end of said chassis to said pipe in said trench, a hitch attachable to said carriage means, said chassis being pivotally mounted midway of its length on said hitch for cantilevering said chassis over a trench, an auxiliary power source mounted on said hitch for said conveyor and said screen, means for varying the attitude of said chassis about said pivot mounting during movement of

said chassis along said trench, and means for varying the speed of said conveyor, whereby backfill from said hopper is delivered to said pipe in said trench at a uniform rate during said movement of said chassis along said trench.

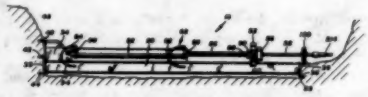


4,955,757

HYDRAULIC APPARATUS FOR INSTALLING PIPING BELOW GROUND

Curtis Balling, 405 Belmont St., Lakefield, Minn. 56150

Filed Jun. 29, 1989, Ser. No. 372,584
Int. Cl.[5] E21B *9/00*
U.S. Cl. 405—184 **21 Claims**



1. An apparatus for installing pipe under ground including:
a frame means having a guide surface and an anchoring means for securing said frame means integrally to the ground;
a carriage supported on said guide surface for reciprocating travel in longitudinal forward and rearward directions relative to the frame means;
a pair of opposed gripping members mounted pivotally to said carriage for movement about respective transverse pivot axes into and away from a closure position about and frictionally engaged with a longitudinally extended pipe section whereby said pipe travels with said carriage and gripping members, said gripping means when pivoted away from the closure position releasing said pipe section for longitudinal travel relative to the gripping means and the carriage;
a drive means mounted to the frame means and to the carriage for reciprocating said carriage in the forward and rearward directions between forward and rearward locations along the guide surface, said drive means acting upon said carriage to maintain the gripping members in the closure position about the pipe section when moving the carriage forward, and to release the pipe section when moving the carriage rearward;
a stabilizing means mounted to said carriage and slidable with respect to said frame means, for maintaining a longitudinal alignment of said gripping members; and
a biasing means mounted to said frame means and positioned to engage said gripping members when said carriage, moving rearwardly, reaches a predetermined location proximate the rearward location, said biasing means, responsive to further rearward movement of the carriage beyond said predetermined location pivoting said gripping members into the closure position about the pipe section.

4,955,758

REINFORCING METHOD AND MEANS

Leo J. Hyde, New South Wales, Australia, assignor to Du Pont (Australia) Ltd., New South Wales, Australia

Filed Jul. 30, 1987, Ser. No. 79,537
Int. Cl.[5] E21D *21/02*
U.S. Cl. 405—261 **9 Claims**

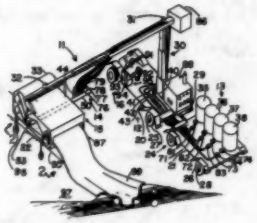
1. A tensionable dowel for reinforcing walls and/or roofs in excavations comprising an elongate member of fibre reinforced engineering plastic having a first end adapted to bond to an anchoring resin and a threaded portion at or adjacent the other end for engaging a nut of corresponding thread, the thread of the nut and the thread on the dowel having different strengths which are selected to cause the hold between said threads to fail at a preselected load to provide an indication that a tension equal to or greater than a preselected value is present in the roof or wall.

4,955,759

DITCH LINING APPARATUS AND METHOD AND PRODUCT THEREFROM

Le Roy Payne, 3300 Nicholas Ln., Molt, Mont. 59057

Division of Ser. No. 235,205, Aug. 23, 1988, Pat. No. 4,872,784. This application Aug. 7, 1989, Ser. No. 389,960
Int. Cl.[5] E02B *3/12*
U.S. Cl. 405—270 **10 Claims**



1. A method of continuously forming a ditch liner including the steps of flowing continuously a solidifiable liquid mixture uniformly simultaneously into an entire width of a continuously moving porous blanket, applying pressure against said liquid mixture and said blanket, working said liquid mixture into said blanket to form a continuous matrix within said blanket, monitoring the rate of advance of said blanket, coordinating said rate of advance with the flow rate of said liquid mixture into said blanket and the pressure applied thereto, laying the resulting liner into a ditch base continuously while deformable and said matrix is adhesive, conforming said liner to said ditch base, bonding said liner to said ditch base and setting said liner in the configuration thereof.

4,955,760

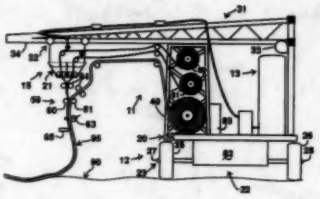
LAMINATE FORMING AND APPLYING APPARATUS AND METHOD AND PRODUCT THEREFROM

Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 235,205, Aug. 23, 1988, Pat. No. 4,872,784. This application Oct. 5, 1989, Ser. No. 417,501

Int. Cl.[5] E02B *3/12;* E01C *23/03*

U.S. Cl. 405—270 7 Claims



1. Mobile continuous structural laminate forming and applying apparatus including a support portion, a raw material supplying portion, a mixing portion, a matrix forming portion and a control portion; said support portion including at least two base sections, carriage means depending from a first base section including a plurality of spaced transverse axle assemblies, wheels mounted on free ends of each axle assembly, a boom section extending from said first base section, transfer means selectively moving a second base section along said boom section, said raw material supplying portion including a plurality of reservoirs disposed on said first base section, said reservoirs being connected independently with said mixing portion through conduit means, blanket support means disposed on said first base section; said mixing portion including a chamber disposed adjacent said second base section and movable therewith, a plurality of deflector sections within said mixing chamber spaced along the length thereof; said matrix forming portion including polymeric mixture delivery means disposed closely adjacent said mixing portion and said second base section and movable therewith, blanket combining means adjacent said mixture delivery means; said control portion including blanket advance monitoring means, means coordinating said rate of advance with the flow rate of liquid polymeric mixture thereon; whereby a solidifiable liquid polymeric mixture is applied to a porous blanket as it passes through said matrix forming portion, the blanket is compressed and immediately deposited on and conformed to a surface while the laminate is deformable so it will be set in the configuration thereof.

4,955,761

PROCESS FOR PNEUMATICALLY CONVEYING MATERIAL AND APPARATUS FOR CONTROLLING THE FEED OF AIR THEREFOR

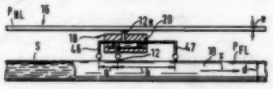
Bernd Federhen, Siegen, and Manfred May, Niederfischbach, both of Fed. Rep. of Germany, assignors to Alb. Klein GmbH & Co. KG, Niederfischbach, Fed. Rep. of Germany

Filed Apr. 24, 1989, Ser. No. 342,245

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1989, 3902388

Int. Cl.[5] B65G *53/66*

U.S. Cl. 406—12 20 Claims



1. An apparatus for pneumatically conveying material comprising a conveyor conduit for conveying said material, secondary conduit means for supplying gas under pressure to said conveyor conduit, at least one connecting conduit means for feeding gas under pressure from said secondary conduit to said conveyor conduit, valve means provided in said connecting conduit and selectively movable between a closed position and an open position for controlling the flow of gas under pressure to said conveyor conduit, first sensing means associated with said valve means for sensing the pressure in said conveyor conduit upstream of said connecting conduit (P_1) and second sensing means associated with said valve means for sensing the pressure in said conveyor conduit downstream of said connecting conduit (P_2) such that said valve means moves from its closed position to its open position when pressure P_1 rises and P_1 is greater than P_2.

4,955,762

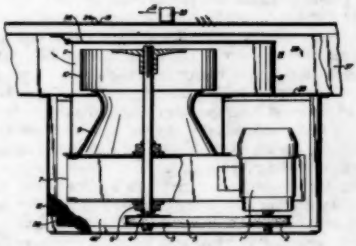
PLENUM FAN ASSEMBLY

Allen D. Hardman, Hollister, Calif., assignor to Raymond Production Systems Corporation, Hollister, Calif.

Continuation-in-part of Ser. No. 256,059, Oct. 11, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 380,686

Int. Cl.[5] B65G *51/02*

U.S. Cl. 406—88 3 Claims



1. An air conveyor assembly comprising an elongated plenum having side walls, a bottom wall and a top deck surface, said top deck surface being characterized as possessing an array of slit openings for the directional discharge of air from the interior of said elongated plenum for the movement of objects along said top deck surface, the improvement comprising providing means for pressurizing the elongated plenum comprising:

a. a high performance wheel fan member for pressurizing said plenum which is entirely enclosed within said plenum member;

b. a substantially circular air-supply inlet located below said wheel fan member and through said plenum bottom wall;

c. a substantially vertical shaft for supporting said wheel fan member and extending through said air-supply inlet;

d. a motor for turning said vertical shaft and, in turn, said wheel fan; and

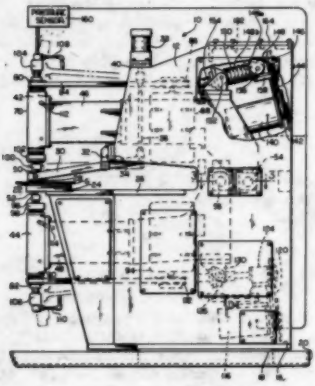
e. a filter housing appended to said plenum bottom wall being characterized as having one or more open side walls having positioned therein filter members through which air is drawn to the interior of said elongated plenum by said wheel fan member and said housing being further characterized as completely enclosing said motor, vertical shaft and air-supply inlet.

4,955,763

GLASS DRILLING MACHINE

Kent A. Delventhal, and Kenith E. Grosjean, both of Genoa, Ohio, assignors to Toledo Automated Concepts, Inc., Oregon, Ohio

Filed Feb. 10, 1989, Ser. No. 309,837
Int. Cl.[5] B23B *39/22*
U.S. Cl. 408—40 32 Claims



1. A machine for drilling a hole in a sheet of a relatively brittle planar material, said machine comprising:

support means for positioning the sheet at a drilling location;

first rotary drilling means for drilling a first hole into the sheet from one side of the sheet, the first hole extending partly through the thickness of the sheet;

secondary rotary drilling means for drilling a second hole into the sheet from the other side of the sheet, the second hole being substantially aligned with the first hole and forming a complete hole with the first hole, the complete hole extending through the sheet;

a first arm having a first end and a second end, said first rotary drilling means being secured to said first arm at a location adjacent said first end of said first arm;

means mounting said first arm for pivot movement relative to said support means, the pivot movement of said first arm being in a plane extending generally transversely through the drilling location and being about a first axis extending through said first arm at a location adjacent said second end of said first arm, whereby said first rotary drilling means can be moved toward and away from the drilling location;

a second arm having a first end and a second end, said second rotary drilling means being secured to said second arm at a location adjacent said first end of said second arm;

means mounting said second arm for pivot movement relative to said support means, the pivot movement of said second arm being in a plane extending generally transversely through said drilling location and being about a second axis extending through said second arm at a location adjacent said second end of said second arm, whereby said second rotary drilling means can be moved toward and away from the drilling location, said second axis being spaced from said first axis;

first adjusting means for adjusting the position of said first arm and said first rotary drilling means along an axis extending longitudinally of said arm; and

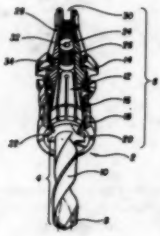
second adjusting means for adjusting the position of said second arm and said second rotary drilling means along said second axis whereby to permit the adjustment of the position of the first rotary drilling means relative to the position of the second rotary drilling means.

4,955,764

BORING TOOL COOLED FROM WITHIN MADE OF A TOOL SPIRAL AND A CLAMPING CYLINDER

Josef Reinauer, Sigmaringen, Fed. Rep. of Germany, assignor to Gottlieb Guhring KG, Ebingen, Fed. Rep. of Germany

Continuation of Ser. No. 167,147, Mar. 11, 1988, abandoned.
This application May 1, 1989, Ser. No. 346,290
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1987, 8704477[U]
Int. Cl.[5] B23B *27/10*
U.S. Cl. 408—59 15 Claims



1. A boring tool comprising:

(a) a tool spiral containing at least one inner coolant channel and

(b) a clamping cylinder comprising a spring chuck and a chuck body,

wherein:

(c) said tool spiral is received in said spring chuck, which carries, on the side facing away from said clamping cylinder, a drive disk that engages interlockingly in clamping slots in said chuck body;

(d) said chuck body has a central internal thread in which an adjusting screw provided with a central recess is threadably engaged;

(e) said tool spiral can be pressed sealingly against said adjusting screw; and

(f) said at least one inner coolant channel in said tool spiral is in fluid communication with said central recess in said adjusting screw when said tool spiral is pressed sealingly against said adjusting screw.

4,955,765

MACHINE TOOL TABLE HAVING DISPOSABLE WOODEN TABLE SECTION MECHANISM

Ronald C. Laird, 405 Picone Dr., Harahan, La. 70123

Filed Aug. 2, 1989, Ser. No. 389,311
Int. Cl.[5] B23Q *3/10*
U.S. Cl. 408—87 9 Claims

1. A machine tool table, comprising:

a supporting structure;

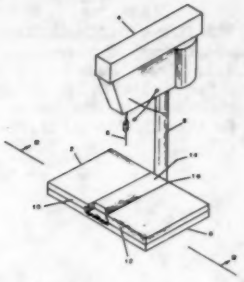
a first table wing;

a second table wing;

a disposable wooden table section, said disposable wooden table section being unattached so that it is freely moveable by an operator, comprised of common lumber; and

attaching means for attaching said first table wing and said second table wing upon said supporting structure so spaced to allow said disposable wooden table section to be positioned loosely upon said supporting structure between the table wings whereby the table wings can thereby counteract the forces of a tool upon said disposable

wooden table section while permitting the disposable table section to be easily moved or replaced by an operator as



needed to compensate for wear and use of different tools upon the table section.

4,955,766

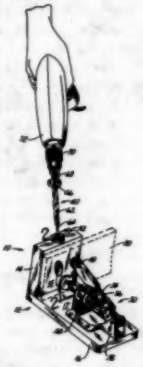
HOLDING FIXTURE FOR DRILLING POCKET JOINTS

Craig A. Sommerfeld, Rte. 1, Kelley, Iowa 50134

Filed Nov. 6, 1989, Ser. No. 432,157

Int. Cl.[5] B23B *47/28*

U.S. Cl. 408—87 **3 Claims**



1. The combination of a holding fixture and a drill bit for use in drilling pocket joints in a workpiece with a drill bit, wherein said combination consists of:

a stop collar attached to said drill bit at a point positioned a first predetermined distance from the free end thereof;

an L-shaped body member including a stationary guide portion and a stationary clamp portion disposed normal thereto to form a 90° junction;

said guide portion including a planar surface for matingly receiving one surface of said workpiece;

said clamp portion including a surface for receiving another surface of said workpiece;

moveable and adjustable means for clamping said workpiece in contact with both the guide portion and the clamp portion to secure the workpiece flush against the planar surface of the guide portion; wherein said moveable and adjustable means are disposed on said surface of the clamp portion for receiving said another surface of the workpiece; and,

a channel formed in said guide portion and being disposed at an angle with respect to said guide portion planar surface such that the channel terminates at an opening in the guide portion planar surface at a point spaced above the 90° junction, said channel having an upper stop flange positioned at a second predetermined distance above the planar surface of said clamp portion wherein said second predetermined distance is greater than said first predetermined distance; whereby, said stop collar on said drill bit engages the stop flange on said channel and a pocket is formed in the workpiece such that the pocket does not extend through the workpiece.

4,955,767

BORING ATTACHMENT

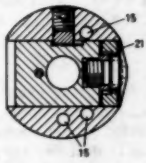
Heinz Kaiser, Wallisellen, and Rudolf Stadelmann, Niederuzwil, both of Switzerland, assignors to Heinz Kaiser AG, Rumlang, Switzerland

Filed Jul. 7, 1988, Ser. No. 216,143

Claims priority, application Switzerland, Jul. 20, 1987, 2736/87

Int. Cl.[5] B23B *27/00*

U.S. Cl. 408—146 **7 Claims**



1. In a boring attachment with an adjustable boring width, comprising a working head having a support surface abutting against a connecting portion and a connecting shaft axially receivable within said connecting portion, and including a transversely displaceable slide for receiving a cutter holding means and including a recess having a diameter sufficient for receiving the cutter holding means, the improvement wherein:

the recess for receiving the cutter holding means extends fully through the transversely displaceable slide so that the cutter holding means is longitudinally displaceable within the recess by an amount equaling at least twice the diameter of the recess;

the boring head is balanced such that loading is substantially eliminated when the cutter holding means is in a transversely displaced position which is within a prescribed operating range for the boring head;

the boring head has a diameter, and an overall height which is approximately equal to or less than the diameter of the boring head; and

the boring head is balanced by one or more bores formed therein.

4,955,768

FIXTURE FOR MAKING A GEAR

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Erie, Pa.

Division of Ser. No. 211,865, Jun. 27, 1988, Pat. No. 4,872,791. This application Sep. 5, 1989, Ser. No. 389,769

Int. Cl.[5] B23F *9/00*

U.S. Cl. 409—10 **5 Claims**

1. A fixture for a gear cutting machine having a frame and a rotatable cutter shaped to simulate a first gear of a flexible gear coupling designed to operate with a second gear at a predetermined angle of misalignment relative to one another comprising:

a control shaft having a first end, a second end, and an axis of rotation,

said first end supported on said fixture,

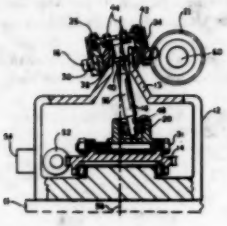
support means supporting a gear blank on said control shaft at a position adjacent said first end of said control shaft,

said gear blank having a center and said axis of rotation of said control shaft passing through said center of said gear blank,

first guide means having an external spherical surface supported on said frame, and having a center of curvature,

a second guide means having an internal spherical surface supported on said first end of said control shaft and engaging said external spherical surface and having a second center of curvature,

said centers of curvature of said first guide means and said second gear being coextensive with one another and coextensive with the center of said gear blank and disposed on said axis of rotation of said control shaft,



drive means connected to said control shaft to swing said second end of said control shaft in a circular path whereby said control shaft is swung in a conical path having an apex at said center of said gear blank,

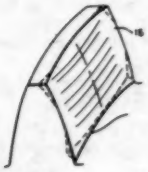
cutting means on said machine for cutting gear teeth on said blank whereby gear teeth are formed on said gear blank operable with said first gear with substantially no interference between the teeth of said second gear when said central axis of said first gear is inclined at a predetermined angle to the central axis of said second gear.

4,955,769

GEAR COUPLING AND HUB

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Erie, Pa.

Division of Ser. No. 211,865, Jun. 27, 1988, Pat. No. 4,872,791.
This application Aug. 4, 1989, Ser. No. 389,527
Int. Cl.[5] B23F *1/00*; F16D *3/18*
U.S. Cl. 409—12 **3 Claims**



1. A gear coupling for connecting two shafts adapted to be operated at a maximum angle of misalignment to one another comprising a sleeve with internal teeth and a hub with external teeth hub,

said hub teeth being meshed with said sleeve teeth,

said hub teeth having been shaped by a cutting tool simulating said sleeve teeth,

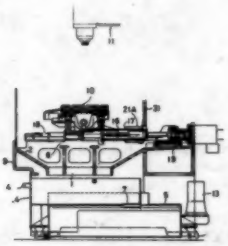
said hub having a center and said center of said hub having been held in a fixed position relative to said cutting tool throughout the shaping thereof and the central axis of said hub having been moved relative to said cutting tool while being shaped relative to the central axis of said sleeve through all maximum angles of misalignment that said hub is intended to encounter in service.

4,955,770

BED FOR A MACHINE TOOL

Koichiro Kitamura, Toyama, Japan, assignor to Kitamura Machinery Co., Ltd., Takaoka, Japan

Continuation of Ser. No. 239,171, Aug. 31, 1988, abandoned.
This application Sep. 29, 1989, Ser. No. 415,405
Int. Cl.[5] B23C *9/00*; B23Q *11/08*
U.S. Cl. 409—137 **5 Claims**



1. A machine tool comprising a feed shaft for moving a working stage on a bed of a machine tool relative to said bed, a stage movement guide for guiding the movement of said working stage, a cover means for covering an upper surface of said stage movement guide, a plurality of chip scraping wipers provided on said feed shaft and said cover, and means for collecting matter, wherein said bed has a first hole arranged above said collecting means and an inclined top surface for guiding matter which has fallen on said bed from said working stage toward said first hole, said stage movement guide comprises first and second guideways for supporting the upper surface of said working stage and guiding the movement of said working stage, said cover means comprises first and second stage guide covers for separately covering upper surfaces of said first and second guideways respectively, each of said first and second stage guide covers having an upper surface with an inclined portion, and said plurality of chip scraping wipers comprises first and second wipers for covering said first and second stage guide covers respectively and a third wiper for covering said feed shaft, whereby said first, second and third wipers wipe upper surfaces of said first and second stage guide covers and said feed shaft respectively through motion of said covers and said feed shaft relative to said bed.

4,955,771

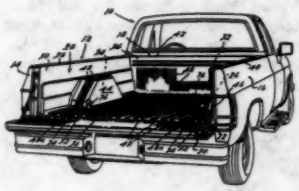
CARGO RESTRAINT SYSTEM

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 119,533, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 815,563, Jan. 2, 1986, Pat. No. 4,717,298, which is a continuation-in-part of Ser. No. 745,587, Jun. 17, 1985, abandoned, which is a continuation of Ser. No. 483,227, Apr. 8, 1983, abandoned. This application Apr. 18, 1989, Ser. No. 341,279
Int. Cl.[5] B60D *45/00*
U.S. Cl. 410—94 **11 Claims**

7. A cargo restraint system for the bed of a truck comprising: a liner for the truck bed; a pair of slats having an upward facing channel extending longitudinally therealong and clamping surfaces extending longitudinally within the channel and toward each other and upper cargo supporting surfaces; at least one cargo restraining member disposed transversely between said slats and having a bracket at each end thereof to support said cargo restraining member above said slats, said bracket having means engageable and disengageable with said

clamping surfaces and guide means spaced from said means and projecting into said channel, said guide means having a width greater than a width of an opening of said channel,



wherein said bracket is restricted in removability to be required to be rotated in only one plane from its position of clamping engagement in order to be removed.

4,955,772

CONNECTING ELEMENT

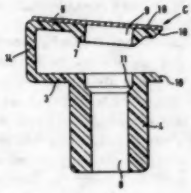
Bernhard Reck, Achenbach, Fed. Rep. of Germany, assignor to EJOT Eberhard Jaeger GmbH & Co. KG, Bad Laasphe, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 386,736

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 8809756[U]

Int. Cl.[5] F16B *37/02*

U.S. Cl. 411—175 **8 Claims**



1. In a one-piece plastic fastener clip comprising first and second legs connected together at a common end by a connecting leg to form a substantially U-shaped clamping part adapted to be mounted onto a plate-shaped carrier having means defining a fastener receiving hole therethrough, an elongated sleeve portion, with a centrally located first bore extending therethrough, provided on said first leg of said clamping part, said second leg having a fastener element guiding second bore therethrough generally coaxial with said first bore when said first and second legs extend parallel to one another, the improvement wherein said first bore has a smooth wall surface and is adapted to receive therein a thread-forming fastening element, wherein an annular centering shoulder is provided on said second leg and extends in an encircling relation with said second bore and on a side of said second leg facing said first leg, said annular centering shoulder being of a uniform height dimension around its entire perimeter, and wherein said first bore has a countersunk portion at an end adjacent said second leg tapering through a chamfer at a juncture between said countersunk portion and the remaining portion of said first bore.

4,955,773

DECORATIVE CAPPED WHEEL NUT AND METHOD OF MAKING SAME

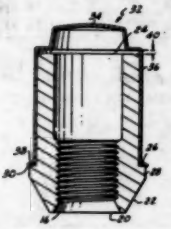
John A. Toth, Orchard Lake, Mich., assignor to Key Manufacturing Group, Inc., Southfield, Mich.

Continuation of Ser. No. 225,293, Jul. 27, 1988, Pat. No. 4,850,776, which is a continuation of Ser. No. 25,030, Mar. 12, 1987, Pat. No. 4,775,272. This application Mar. 31, 1989, Ser. No. 331,374

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.[5] F16B *37/14*

U.S. Cl. 411—429 **31 Claims**



3. A decorative capped wheel nut for holding a wheel on a motor vehicle and being of the type exposed to view on the wheel, comprising:

a nut insert having a central threaded aperture, polygonal sides, a first end adapted to engage said wheel and a second end opposite said first end, said nut insert including a shoulder and including a generally longitudinally extending surface adjacent said first end, said generally longitudinally extending surface intersecting said shoulder to form essentially a projection between said polygonal sides and said first end; and

a cap for said nut insert, said cap having a side section extending over the polygonal sides of said nut insert and an end section covering the second end of said nut insert, said cap including a free end overlying said projection, only said free end being welded to said nut insert at said projection the free end being defined as the portion of the cap most remote from the end section of the cap.

4,955,774

MODULAR BALE ACCUMULATOR

Roger H. Van Eecke, Blankenberge, and Adrianus Naaktgeboren, Zedelgem, both of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 11, 1989, Ser. No. 378,748

Claims priority, application European Pat. Off., Jul. 12, 1988, 88201479.8

Int. Cl.[5] A01D *87/12*

U.S. Cl. 414—111 **12 Claims**

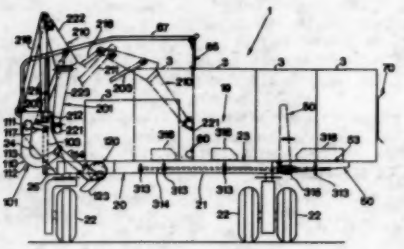
1. An agricultural bale accumulator comprising:

a base module having a substantially planar table for receiving a plurality of bales thereon;

a bale transfer module for individually turning each bale received on said table through substantially 90° about its longitudinal axis, wherein each bale remains on said table but is reoriented 90° from its initial position;

a bale transfer module for laterally shifting the reoriented

bales across said table so as to accumulate the bales into a parcel thereof; and



said bale transfer module and bale turning module being independently attachable to and detachable from said base module.

4,955,775

SEMICONDUCTOR WAFER TREATING APPARATUS

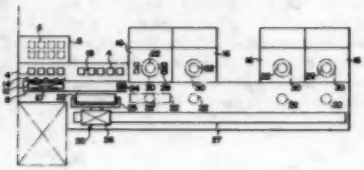
Wataru Ohkase, Sagamihara, and Seishiro Sato, Machida, both of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

Filed Dec. 9, 1988, Ser. No. 281,756

Claims priority, application Japan, Dec. 12, 1987, 62-314925

Int. Cl.[5] F27D *3/00*

U.S. Cl. 414--152 **5 Claims**



5. A semiconductor wafer treating apparatus comprising:

exchange means for allowing an exchange of the semiconductor wafers between a wafer container and a wafer vessel for heat treatment, in a predetermined exchange position;

a plurality of vertical type heat treatment furnaces;

transfer means for allowing the wafer vessel which holds the semiconductor wafers thereon to be conveyed between said exchange position and each of said vertical type heat treatment furnaces, and for allowing transfer of the vessel between the transfer means and the heat treatment furnaces, said wafer vessel being transferred while held in a vertical orientation;

a handler mounted on said transfer means for allowing said wafer vessel to be oriented in vertical and horizontal directions, by rotating said wafer vessel around its center; and

elevator means provided within each heat treatment furnace to take the wafer vessel from the transfer means and load the vessel into a vertically oriented process tube and unload the vessel out of the process tube.

4,955,776

APPARATUS FOR CHARGING SOLIDS UNDER COMPRESSION INTO A RECEPTACLE

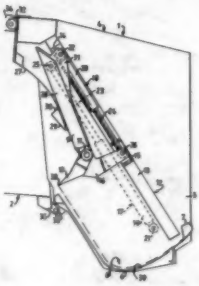
Ingemar Dahlin, Blomstermåla, Sweden, assignor to Norba AB, Sweden

Filed Feb. 9, 1989, Ser. No. 308,723

Claims priority, application Sweden, Feb. 15, 1988, 8800493

Int. Cl.[5] B65F *3/14*

U.S. Cl. 414—525.2 **5 Claims**



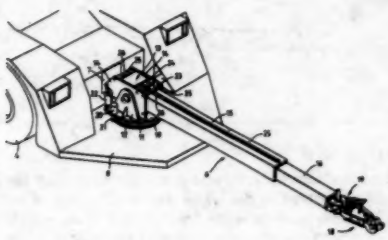
1. Apparatus for charging solids under compression into a receptacle from a hopper, comprising a guiding means, a charging unit reciprocally movable along said guiding means, said charging unit comprising two plates pivotably mounted around a common axis, one of said plates constituting a transport plate and the other plate constituting a press plate which is pivotable around said common axis between an inner and an outer position, first driving means for moving said charging unit between an upper and a lower end position, second driving means for moving said charging unit whereby said press plate is movable by said second driving means in an outwardly pivoting movement when the charging unit is in its upper end position and in an inwardly pivoting movement towards the receptacle and generally following the form of a bottom surface of the hopper when the charging unit is in its lower end position, an upper end of said transport plate being guided by said guiding means, and said press plate being also guided by said guiding means by means of a lever arm, and wherein said first driving means is attached to an upper end of said transport plate in order to achieve said reciprocal movement of the charging unit and to secure said upper end of the transport plate against a movement along said guiding means during a substantial part of the pivoting movement of the press plate, said transport plate, when in its lower position, being pivotably movable around a pivoting center, mainly without movement of the latter, in a direction towards a wall part of the hopper for performing a first compression of solids against said wall part, and wherein said second driving means is operable to effect said inwardly pivoting movement of said press plate by means of a downwardly directed movement along said guiding means of said lever arm to cause said pivoting movement of the press plate about said common axis, said lever arm being guided by the guiding means by means of guidable means which is movable along the guiding means during the pivoting movement of the press plate, whereby the pivoting point of the press plate is caused to move in a direction towards and away from the guiding means respectively.

4,955,777

AIRCRAFT GROUND HANDLING TRACTOR

Malcolm P. Ineson, Cheltenham, Great Britain, assignor to M L Douglas Equipment Ltd, Cheltenham, Great Britain

Filed Mar. 24, 1989, Ser. No. 328,540
Claims priority, application United Kingdom, Mar. 29, 1988, 8807492
Int. Cl.[5] B64F 1/22; B60P 1/54; B60D 7/00
U.S. Cl. 414—426 15 Claims



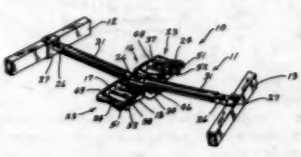
1. In an aircraft ground handling tractor, a manoeuvrable boom having a free end and being mounted on said tractor, a connector means, capable of being connected to an aircraft nosewheel assembly being provided at said free end of said manoeuvrable boom for enabling said tractor to pull or push said aircraft in a substantially horizontal plane, the improvement wherein said manoeuvrable boom is retractable completely within outer limits of said tractor whereby when said tractor is not pulling said aircraft said manoeuvrable boom is retractable wholly within said outer limits of said tractor and is protected from damage.

4,955,778

BOAT TRAILER PIVOTAL ROLLER KEEL SUPPORT ASSEMBLY

Byron L. Godbersen, Lake LaJune Estates, Ida Grove, Iowa 51455

Filed May 15, 1989, Ser. No. 351,928
Int. Cl.[5] B60P 3/10
U.S. Cl. 414—534 4 Claims



1. In a boat trailer, for transporting a boat, the trailer including a pair of laterally spaced frame members and a cross member connected to and disposed transversely between the frame members, an assembly mounted intermediate the cross member for movably supporting the central keel of a boat comprising:

bracket means including a pair of transversely connected and spaced brackets each of which has front and rear flanges disposed in a common plane;

means mounting said bracket means to the cross member for pivotal movement in a vertical plane about a transverse normally horizontal axis, said brackets spaced equidistantly on opposite sides of the centerline of the trailer and with said front and rear flanges spaced equidistantly fore and aft of the cross member and wherein the central keel of a boat can rest on the cross member; and

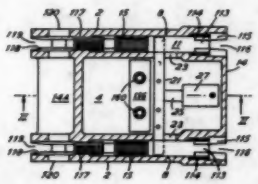
a roller unit pivotally mounted to each of said flanges, and with one or more rollers rotatably mounted on each roller unit, and with the longitudinal axis of each roller extended transversely between the frame members, and further wherein said brackets are U-shaped, and with said means mounting said bracket means to the cross member at a pivot point below the cross member.

4,955,779

CONNECTOR

Jack S. Knackstedt, London, United Kingdom, assignor to Jaromir Vaclav Drazil, Little Chalfont, United Kingdom

PCT No. PCT/GB87/00760, § 371 Date Aug. 3, 1988, § 102(e) Date Aug. 3, 1988, PCT Pub. No. WO88/03198, PCT Pub. Date May 5, 1988
PCT Filed Oct. 27, 1987, Ser. No. 215,066
Claims priority, application United Kingdom, Oct. 28, 1986, 8625778
Int. Cl.[5] B66C 23/00; E02F 3/96
U.S. Cl. 414—723 19 Claims



1. A connector for attaching a tool or an attachment to a machine, comprising a carrier adapted for fitment to said machine, and a holder adapted for fitment to said tool or attachment, the carrier comprising first and second elongate hollow members having first and second slides situated displaceably therein, a chamber within said carrier which chamber is situated between the hollow members, and displacement means connected to said slides for displacement of the slides, the connector further comprising connection means disposed on said carrier and said holder for the interconnection and disconnection of the carrier and holder, the connection means including two first connection members on the holder engageable with two first connection elements on the carrier, and two second connection members on the holder engageable with two second connection elements attached to the slides, wherein the chamber is substantially closed, and each said hollow member has a portion which communicates, via a slot, with the chamber, whereby a substantially closed cavity is defined in the carrier, and the displacement means include spring means, biasing the slides to a position in which the second connection elements are interlocked with the second connection members, and a displacer situated in the chamber and associated with a link member which extends from the chamber through the slots into the hollow members and interconnects said slides such that the slides are, via the link member, simultaneously displaceable against the force of the spring means.

4,955,780

WAFER POSITIONING APPARATUS

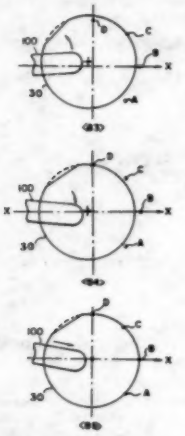
Kazuo Shimane, Kawasaki; Nobuo Iijima, Tama, and Tatsuro Kawabata, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 13, 1988, Ser. No. 257,321
Claims priority, application Japan, Oct. 20, 1987, 62-262736
Int. Cl.[5] B25J 13/08
U.S. Cl. 414—744.2 12 Claims

6. A wafer positioning apparatus for a wafer having a circumference defined by a first circle of a first predetermined diameter and the center of the first circle defining the center of the wafer, comprising:

a set of at least three optical position detectors positioned at angularly spaced locations on the circumference of a second circle having a diameter equal to the diameter of the first circle, the set of detectors comprising at least two outer detectors and at least one intermediate detector angularly spaced therebetween, the angularly spaced locations of the respective detectors being fixed on the circumference of the second circle relatively to a predetermined axis passing through the center and along a diameter of the second circle;

transportation means for holding a wafer in a plane parallel to the plane of the second circle and for moving the wafer, so held, relatively to the set of detectors, selectively in a linear direction and in rotation about an axis of rotation



transverse to the predetermined axis and exterior to the circumference of the second circle;

each said detector having first and second states and producing corresponding output signals responsive to the presence or absence of detection of the wafer thereby; and

control means responsive to the output signals of said detectors for controlling the transportation means for moving the wafer relatively to said set of detectors, selectively in rotation and translation, to position the center of the wafer on the predetermined axis and then by translation along the predetermined axis until at least three of the detectors of the set thereof simultaneously detect corresponding positions on the circumference of the wafer thereby to alignment of the center of the wafer with the center of the second circle.

4,955,781

VARIABLE RATE BOAT LOADING METHOD

Brice R. Holladay, 9732 SW. Siuslaw, Tualatin, Oreg. 97062

Division of Ser. No. 288,075, Dec. 21, 1988, Pat. No. 4,907,934. This application Nov. 27, 1989, Ser. No. 442,839

Int. Cl.[5] B60P *3/10*

U.S. Cl. 414—786 **6 Claims**

1. A method of loading a boat onto the top of a vehicle, wherein the boat has a first end and a second end defining a length greater than the height of the vehicle and a center of gravity located closer to the second end than to the first end, the loading method comprising:

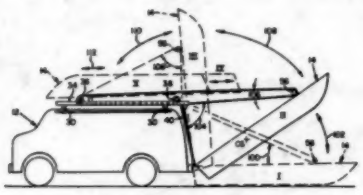
mounting winch means to the top of the vehicle;

attaching a pulley to the boat at a position between the first end of the boat and the center of gravity thereof;

positioning the boat in an initial, unloaded position such that the boat is upright and has the first end thereof located at a distance spaced apart from an end of the vehicle and a second end thereof located adjacent to the vehicle;

connecting a first end of a winch line to said winch means and extending the winch line from the top of the vehicle lengthwise of the boat through said pulley and back to the top and end of the vehicle;

supporting the second end of the boat from the top and end of the vehicle via a second end portion of the winch line;



pulling said winch line by said winch means to cause the first end of the boat to rise while the second end pivots about a connection to the second end portion of the winch line, said winch line exerting a doubled mechanical advantage when lifting the boat to a point that the pulley reaches a height level with of the top of the vehicle.

4,955,782

DEVICE TO PALLETIZE YARN PACKAGES

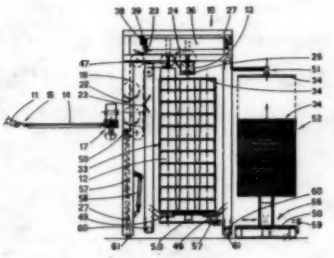
Armando D'agnolo, Porcia, Italy, assignor to Matics SrL, Pordenone, Italy

Filed Mar. 23, 1989, Ser. No. 327,786

Claims priority, application Italy, Apr. 18, 1988, 83366 A/88

Int. Cl.[5] B65G *61/00, 57/04, 57/24*

U.S. Cl. 414—789.5 **21 Claims**



1. Device to palletize yarn packages, which is suitable for installation downstream of yarn package production machines, the yarn packages being taken substantially at the outlet of the production machine and loaded in an orderly manner on pallets suitable to form pallet loads, the device comprising in working relationship on a frame:

a substantially horizontal conveyor to transfer yarn packages, which extends lengthwise parallel to the lengthwise axis of the production machine and cooperates with the package discharge of the production machine;

a delivery head substantially in line with the transfer conveyor and suitable to orient and transfer the yarn packages;

an elevator to take the yarn packages to a required vertical level above the horizontal plane on which the transfer conveyor lies;

an overturning means cooperating with the elevator and suitable to orient and transfer the yarn packages;

a substantially horizontal positioner conveyor for the yarn packages, which extends lengthwise at a right angle to the

lengthwise axis of the production machine and forms the lengthwise coordinate for depositing the yarn packages on the pallet;

a movable trolley which is solidly fixed to the positioner conveyor and comprises at least one head to deposit yarn packages on the pallet, the trolley forming the transverse coordinate for depositing the yarn packages on the pallet; and

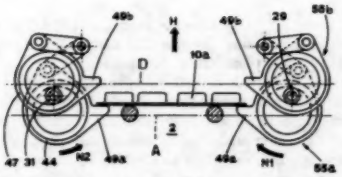
means to engage, handle and position cartons and the pallets within the frame, the frame being able to move in a direction substantially at a right angle to the lengthwise axis of the yarn package production machines.

4,955,783

DEVICE FOR FORMING A PILE OF BLISTER PACKS IN AN UPWARD DIRECTION

Alessandro Grazia, Crevalcore, Italy, assignor to I.M.A. Industria Macchine Automatiche S.p.A., Ozzano Emilia, Italy

Filed Mar. 13, 1989, Ser. No. 322,425
Claims priority, application Italy, Apr. 13, 1988, 3410 A/88
Int. Cl.[5] B65G *57/30*
U.S. Cl. 414—795 **9 Claims**



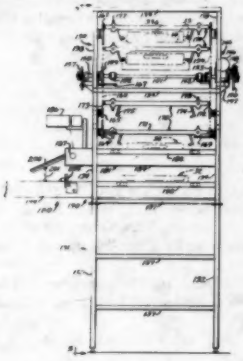
1. A device for forming a pile of blister packs and moving said pile in an upward direction, said device comprising: a support structure; a feed line for blister packs; a station for collecting said blister packs, said station being formed by two facing vertical side walls, and a vertical back wall, with said side and back walls mounted on said structure and with said line ending between said vertical side walls; first means for supporting and stacking said blister packs, said first means being located inside said vertical side walls; facing first and second pairs of eccentric means, each pair of said eccentric means being identical in construction and reciprocally staggered by an equal number of degrees, with an axis of each pair of said eccentric means being parallel to the direction by which said blister packs enter said station; a ring for each one of said eccentric means mounted thereon; each ring defining a tooth; an eccentric means from each of said first and second pairs of eccentric means forming facing first and second groups, said first and second groups alternating cyclically with one another following a series of positions located at different levels from one another, in a first stage said teeth of said first group protruding in an upward direction so as to engage with the edges of a blister pack located in said station and raise said blister pack while said teeth belonging to said second group move in a downward direction, and in a second stage said teeth belonging to said first group moving in a downward direction thus causing said blister pack to be released upon a second blister pack picked up from said line and supported by said teeth of said second group, with said teeth of said second group projecting in an upward direction, or else, if there is no blister on said teeth of said second group, said blister pack is directly released upon said teeth of said second group.

4,955,784

APPARATUS FOR UNSTACKING CROSS-NESTED ARTICLES

Edward T. Staszewski, Chicago Ridge; Steve J. Reynolds, Tinley Park; Richard C. Vinyard, Burbank, and Bennie E. Galloway, Plano, all of Ill., assignors to Advanced Pulver Systems, Inc., Chicago Ridge, Ill.

Filed Jul. 29, 1988, Ser. No. 225,965
Int. Cl.[5] B65G *59/10*
U.S. Cl. 414—796.4 **15 Claims**



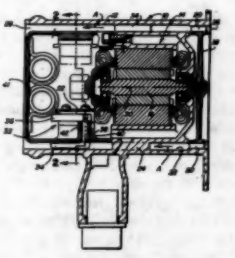
1. Apparatus for unstacking elongated articles from a stack of articles in which each article has the longitudinal axis thereof disposed perpendicularly to the longitudinal axis of adjacent articles in the stack, said apparatus comprising: transfer means for removing the top two articles from the stack simultaneously and conveying them to a discharge station, means at the discharge station for separating the two removed articles, means for reorienting one of the separated articles so that its longitudinal axis extends in substantially the same direction as that of the other separated article, and discharge means for carrying the two articles sequentially from the discharge station.

4,955,785

FAN STRUCTURE WITH FLOW RESPONSIVE SWITCH MECHANISM

Mordechai Cohen, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 5, 1988, Ser. No. 279,869
Int. Cl.[5] F01D *21/14*
U.S. Cl. 415—26 **7 Claims**



1. In a fan structure, a flow responsive switch mechanism, comprising in combination:

housing means including a first part defining a motor compartment for housing a motor means with an axis and a second part connected to the first part and defining an annular fan involute outside the motor compartment;

impeller means in the housing means and coupled to the motor means for forcing air substantially axially of the motor axis through the fan involute defined by the first and second housing means parts;

a vane disposed in the fan involute and rotatably mounted on the housing means for rotation in response to air flow through the fan involute; and

electrical switch means mounted on the housing means and operatively associated with the vane for altering the state of the switch means in response to air flow through the fan involute from the impeller means.

4,955,786

DRIVE DEVICE FOR PUMPS

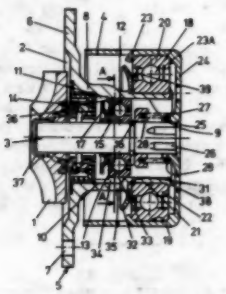
Heinrich Kunkel, Schweinfurt; Heinz Kiener, Waigolshausen, and Armin Olschewski, Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,531

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3716098

Int. Cl.[5] F04D *29/04*

U.S. Cl. 415—110 **9 Claims**



1. Drive device for pumps consisting of a pump rotor mounted in a pump chamber; a pump covering the pump chamber with a projecting neck provided with a housing bore passing all the way from the pump chamber to the outside; and a shaft which passes through said housing bore and which is connected at its inner end to the pump rotor and at its outer end to a drive pulley; means rotatably supporting the shaft comprising an inner bearing seated in the housing bore and the drive pulley on an outer bearing seated on a lateral surface of the neck; a cover disk with an outer edge, covering the outer bearing and the neck of the pump cover laterally from the outside and is connected to the drive pulley, and a center section connected to the shaft, adjusting means for the automatic play-eliminating adjustment of the radial and axial load-supporting outer and inner bearing including means acting in an elastic manner to move the cover disk either inward toward the pump chamber or outward away from the pump chamber with respect to the pump cover, the neck (8) of the pump cover (5) being defined by thin wall and in that an inner bearing ring (22) of the outer bearing (18) is seated firmly on a cylindrical section (21) of the lateral surface of the neck (8); and in that this neck (8) has plastically formed, axially oriented bulges (30) projecting radially from the lateral surface section (21), each bulge (30) having on the end which faces away from the pump chamber (2) a shoulder surface section (31) for limited peripheral support of an opposing end surface of the bearing inner ring (22).

4,955,787

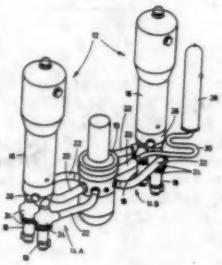
ASSEMBLY FOR FACILITATING INSERVICE INSPECTION OF A REACTOR COOLANT PUMP ROTOR

Luciano Veronesi, O'Hara Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 12, 1989, Ser. No. 364,953

Int. Cl.[5] B01D *25/00*

U.S. Cl. 415—118 **19 Claims**



1. In a pump having an outer casing and a rotor rotatably mounted in said casing, an assembly for facilitating inservice inspection of said pump rotor, comprising:

(a) means defining a cylindrical bore through said casing in axial alignment with an end of said pump rotor;

(b) an extension on said rotor end and rotatable therewith, said extension including a cylindrical coupler member extending into said bore and having an outer end with an element configured to receive a tool for performance of inservice rotor inspection;

(c) a hollow cylindrical member disposed in said bore and surrounding said coupler member, said cylindrical member being slidably movable relative to said coupler member along said bore between a retracted position wherein said cylindrical member is stored for normal pump operation and an extended position wherein said cylindrical member is extended for permitting inservice rotor inspection; and

(d) a cover member sealably attached to said casing across said bore for closing said bore and retaining said cylindrical member at its retracted position for normal pump operation, said cover member being detachable from said casing for opening said bore and allowing movement of the cylindrical member to its extended position to permit inservice rotor inspection.

4,955,788

DRIVING LINKAGE DEVICE

Masanori Kimura; Shigetoshi Narisue; Hiroshi Nakatomi, and Eito Matsuo, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1988, Ser. No. 194,284

Int. Cl.[5] F01D *17/14*

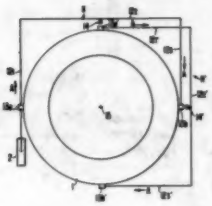
U.S. Cl. 415—150 **10 Claims**

1. A driving linkage device comprising:

a driving ring of a device such as a variable nozzle or a variable diffuser;

means rotatably supporting said ring in a bearing-free state with a center point of said ring maintained in one position when said ring is rotated about said center point, said means for supporting said ring including two sets of adjusting links, each said set including two spaced substan-

tially parallel levers and a third lever directly pivotally connected to said two levers at respective locations space along said third lever, said two levers extending in the same direction towards, and directly pivotally connected



to, said ring at circumferentially spaced-apart positions on said ring, and said third lever being pivotally supported by a fulcrum; and

an actuator attached to an outer periphery of said ring for rotation thereof.

4,955,789

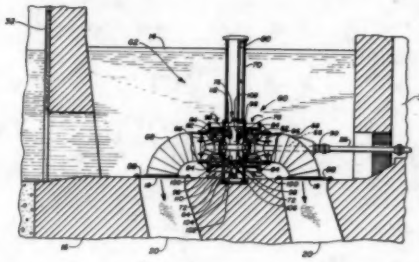
DUPLEX TURBINE REPLACEMENT UNIT AND METHOD

Selim A. Chacour, and William H. Colwill, both of York, Pa., assignors to American Hydro Corporation, York, Pa.

Filed Apr. 24, 1989, Ser. No. 342,961

Int. Cl.[5] F04D *29/60*

U.S. Cl. 415—201 **6 Claims**



1. A duplex turbine replacement unit adapted for horizontally submersible installation within a headwater chamber of a hydroelectric power plant and comprising in combination; a turbine casing supported by a foundation recess to receive a single pedestal support therefor and adapted to provide a protective air chamber and therewithin mounting a spaced set of aligned bearings to in turn laterally support a turbine drive shaft extending outwardly either side of said casing, a spaced set of runners axially mounting upon said drive shaft either side of said casing and outward of said bearings and profiled in a back-to-back configuration to discharge turbine water respectively therefrom in opposing directions and thereby provide a balanced hydraulic thrust condition upon turbine water flow operation thereof, outwardly projecting and connectably communicating with said casing a radial array of regularly spaced stayvanes for each of said runners each in turn enclosing and being cooperative in directing and controlling turbine water flow with a corresponding radially arrayed set of adjustable wicket gate blades respectively rotatably adjustable on their own axes and having a cooperative wicket gate adjustment means and a drive therefor housed inside said turbine protective air chamber, and a coupling means to connectably join said turbine drive shaft to a generator drive shaft to operationally drive an electrical generator within said hydroelectric power plant.

4,955,790

CURRENT LIMITING CIRCUIT FOR FUEL PUMP MOTOR

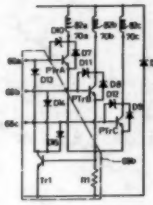
Shingo Nakanishi, Obu, and Susumu Yamamoto, Kawasaki, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu and Fuji Electric Co., Ltd., Kawasaki, both of, Japan

Filed Dec. 14, 1988, Ser. No. 284,408

Claims priority, application Japan, Dec. 28, 1987, 62-200368

Int. Cl.[5] F04B *17/00, 35/04*

U.S. Cl. 417—45 **5 Claims**



1. A motor-driven fuel pump comprising a pumping unit, a brushless electric motor having a plurality of stator coils, and a control circuit for controlling power supplied to said brushless motor for driving said pumping unit, said power being a starting amperage for initially starting said pumping unit and a running amperage for operating said pumping unit with said starting amperage being significantly higher than said running amperage; wherein the improvement comprising:

a current adjusting circuit forming part of said control circuit and including:

a plurality of power transistors with a base, each said power transistor connected in series to one of said plurality of stator coils;

a resistor connected in series to said each stator coil;

a threshold transistor having a base connected to said resistor, an emitter and a collector; and

a plurality of signal conductors, each connected to said collector of said threshold transistor and each respectively connected to said corresponding base of each said power transistor;

said current adjusting circuit initially receiving said power and determining said starting amperage which has a tendency to exceed a predetermined amperage, said predetermined amperage being slightly higher than said running amperage and defined by said resistor and said threshold transistor, said current adjusting circuit resisting said starting amperage from exceeding said predetermined amperage by causing a voltage between the base and emitter of said threshold transistor to increase and a resistance between the collector and the emitter of said threshold transistor to decrease causing a resistance at said power transistors to increase and said starting amperage decreasing to said predetermined amperage.

4,955,791

SMALL SIZE FAN

Günter Wrobel, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Papst-Motoren & Co. GmbH, Fed. Rep. of Germany

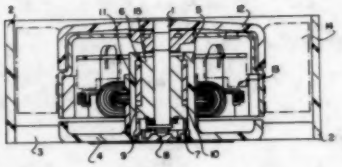
Continuation-in-part of Ser. No. 137,945, Dec. 28, 1987, Pat. No. 4,801,252, which is a continuation of Ser. No. 731,880, May 8, 1985, Pat. No. 4,743,173, and a continuation-in-part of Ser. No. 930,421, Nov. 14, 1986, Pat. No. 4,737,673. This application Sep. 21, 1988, Ser. No. 247,336

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731710; Mar. 19, 1988, 3809277

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.[5] F04D *29/00*; F16C *27/00*

U.S. Cl. 417—354 **35 Claims**



1. A bearing arrangement for the shaft of an axial flow small compact sized fan comprising:

a central driving motor for the fan which has a shaft which drives an impeller of the fan;

a bearing unit means for said shaft;

said bearing unit means contacting and supporting said shaft in a radial direction as concerns the rotation of the shaft;

a bearing support tube means located radially outward of the bearing unit means and supporting said bearing unit means in a radial direction as concerns the rotation axis of the shaft;

a flow duct surrounding the impeller and having a flange means extending inwardly from adjacent the outer edge of the flow duct;

the bearing support tube means having a first shoulder portion;

a closure means having a second shoulder portion;

the bearing unit means being braced between the first and second shoulder portions; and

the closure means being supported by said flange means.

4,955,792

DRIVE FOR A LUBRICATION PUMP

Günter Skarupa, Pegnitz/Bavaria, Fed. Rep. of Germany, assignor to Baier & Koppel GmbH & Co, Präzisionsapparate, Pegnitz/Bavaria, Fed. Rep. of Germany

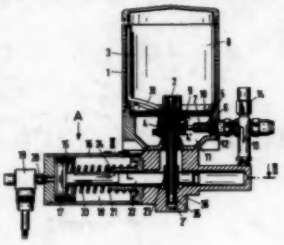
Filed May 1, 1989, Ser. No. 345,781

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815233

Int. Cl.[5] F04B *17/04*

U.S. Cl. 417—399 **14 Claims**

1. In a drive for a lubrication pump for a centralized lubrication system of utility vehicles, including trailers, semi-trailers, special vehicles and the like, the lubrication pump being used for lubricants which are difficult to press and have a high penetration, the lubrication pump including an agitator mounted in a lubricant container, a delivery piston for transporting the lubricant, and an eccentric member for driving the delivery piston, the agitator and the eccentric member being mounted on a common drive shaft, the improvement comprising the drive for the lubrication pump being a pneumatic drive,



the drive further comprising an explosion-protected magnetic valve for controlling the drive.

4,955,793

TURBOPUMP AND SIMILAR OPERATING MACHINE WITH SEALING CONNECTION STRUCTURE TO THE MOTOR

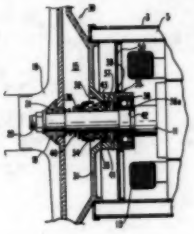
Bruno Caoduro, Montecchio Magg., Italy, assignor to NOWAX s.r.l., Vicenza, Italy

Filed Feb. 14, 1989, Ser. No. 310,677

Claims priority, application Italy, Aug. 17, 1988, 85628 A/88

Int. Cl.[5] F04D *17/08, 29/04*

U.S. Cl. 417—423.11 **7 Claims**



1. An electrically operated turbopump or similar turbomachine comprising:

an electric motor assembly including a tubular motor casing having a first and second ends, a cover closing said first end of motor casing, and a drive shaft rotatably mounted within said motor casing by a first bearing supported by said cover and by a second bearing adjacent said second end of said motor casing and prevented from axial displacement relative to said motor casing;

a pump assembly including a pump casing, an impeller housed within said pump casing drivingly connected to said drive shaft, a sealing structure including a movable first annular sealing element mounted on said drive shaft at a position adjacent said second bearing, a fixed second annular sealing element stationarily positioned about said drive shaft at a location between said second bearing and said movable first annular sealing element, and spring means urging said movable first annular sealing element toward said fixed second annular sealing element to thereby achieve a seal therebetween; and

a coupling structure rigidly connecting said motor assembly to said pump assembly, said coupling structure comprising a single coupling flange including:

a peripheral portion extending generally radially of said drive shaft and connecting said pump casing to said second end of said motor casing, said peripheral portion

comprising the only partition separating said pump casing and said motor casing;

a central portion of substantially cylindrical configuration extending axially from said peripheral portion about said drive shaft;

first supporting means rigid with said central portion and stationarily supporting said fixed second annular sealing element;

second supporting means rigid with said central portion and stationarily supporting said second bearing; and

said first and second supporting means being located at fixed positions spaced axially of said central portion;

whereby during operation relative distances between said second bearing, said movable first annular sealing element and said fixed second annular sealing element are maintained substantially constant by said first and second supporting means, thereby maintaining said seal, under conditions tending to reduce the biasing force of said spring means and to cause said movable first annular sealing element to move axially of said fixed second annular sealing element.

4,955,794
APPARATUS FOR FORMING AND CONVEYING GROUPS OF FLAT STACKED ITEMS

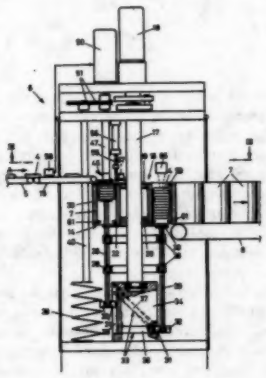
René Fluck, Schleitheim, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Oct. 7, 1988, Ser. No. 254,681

Claims priority, application Switzerland, Oct. 15, 1987, 4045/87

Int. Cl.[5] B65G *57/03*

U.S. Cl. 414—790.4 9 Claims



1. A stacking apparatus for forming groups of face-to-face contacting flat items, comprising

(a) a supply conveyor means for advancing a column of serially arranged, flat-lying items;

(b) a stack-forming unit situated in a charging station and arranged for sequentially receiving the items from said supply conveyor means;

(c) a plurality of stacking containers each having an inner volume for accommodating a stack of the items and having at least one open end face;

(d) means for positioning an empty one of said stacking containers in said charging station such that the open end face of said stacking container adjoins said stack-forming unit;

(e) a stop means arranged in said charging station for arresting each item in said stack-forming unit upon delivery by said supply conveyor means;

(f) intermittent actuating means for causing said stack-forming unit to cyclically deposit an item in said stacking container to form an article stack therein; said intermittent actuating means including

(1) a sensor means for generating a signal indicating a presence of an item to be deposited by said stack-forming unit; said sensor means being situated upstream of said stack-forming unit as viewed in a direction of advance of the articles on said supply conveyor means; and

(2) moving means connected to said sensor means and said stack-forming unit for causing said stack-forming unit to perform an item depositing step upon receiving said signal from said sensor means;

(g) a removal conveyor means for moving away filled stacking containers from said stack-forming unit;

(h) means for transferring a filled stacking container from the charging station to said removal conveyor means;

(i) a rotary platform including means for supporting a plurality of stacking containers in a circular array; said charging station being situated adjacent said rotary platform;

(j) a loading station situated adjacent said rotary platform;

(k) means for placing an empty stacking container into said rotary platform in said loading station;

(l) an unloading station situated adjacent said rotary platform; said means for transferring a filled stacking container being situated in said unloading station;

(m) indexing means for stepwise turning said rotary platform to successively move the stacking containers from the loading station to the charging station and from the charging station to the unloading station;

(n) a plurality of pickup bases;

(o) means for supporting each said pickup base for vertical reciprocation;

(p) means for moving said pickup bases s a unit in synchronism with said rotary platform; each said pickup base being arranged to be in alignment with a respective said stacking container positioned in said rotary platform;

(q) a follower means secured to each said pickup base;

(r) means defining a first guide track extending helically from said loading station to said charging station for receiving each said follower and for shifting each pickup base upwardly into a respective stacking container as the stacking container moves from the loading station into the charging station;

(s) means defining a second guide track extending vertically in said charging station for receiving each said follower and for guiding the pickup base downwardly into a lowermost position out of the stacking container in said charging station;

(t) means defining a third guide track extending generally horizontally and receiving each said follower for maintaining each pickup base in the lowermost position as the stacking container moves from the charging situation to the unloading station; and

(u) means for stepwise lowering the pickup base in said charging station within the stacking container dwelling in said charging station, in synchronism with the performance of each depositing step of said stack-forming unit.

4,955,795
SCROLL APPARATUS CONTROL

Russell W. Griffith, Troy, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Dec. 21, 1988, Ser. No. 287,912

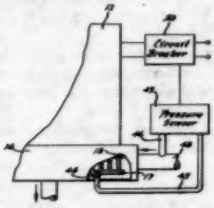
Int. Cl.[5] F04B *49/02*

U.S. Cl. 417—44 12 Claims

1. A scroll machine, comprising:

(a) a scroll assembly comprising a pair of scroll members, each including an end plate and an upstanding spiral wrap, said spiral wraps intermeshing with one another so as to define a plurality of packets whereby orbiting of one scroll member with respect to the other scroll member will cause said pockets to progressively change in volume:

(b) means defining an inlet chamber for supplying inlet fluid to said scroll assembly;
(c) drive means for causing one of said scroll members to orbit with respect to the other scroll member; and
(d) control means responsive to a control pressure for deenergizing said drive means when said pressure is of a value indicating an undesirable machine condition, said control pressure being the pressure of fluid in one of said pockets, said control pressure being sensed at a point on a scroll member which is more than 360° from the outer end of the wrap which defines the outside of said one of said pockets.

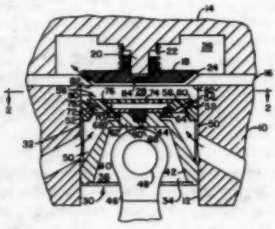


4,955,796

REFRIGERANT GAS COMPRESSOR CONSTRUCTION

Gerald L. Terwilliger, Bristol, Va., assignor to Bristol Compressors, Inc., Bristol, Va.

Filed Sep. 21, 1988, Ser. No. 247,395
Int. Cl.[5] F04B 39/08
U.S. Cl. 417—547 17 Claims



1. In a refrigerant compressor having cylinder means, piston means mounted for reciprocation in said cylinder means and having a substantially planar top, cylinder head means mounted over the end of said cylinder means to provide a compression chamber, and refrigerant discharge valve means in said cylinder head means adapted to open a discharge passage for pressurized refrigerant on the compression stroke of said piston means and to close said discharge passage on the suction stroke of said piston means,

first suction gas inlet passage means through the wall of said cylinder means at a position remote from said cylinder head means,

second suction gas inlet passage means in said piston means extending through the outer wall thereof and in communication with said first passage means over at least a substantial portion of the travel of said piston means,

suction gas port means through the top of said piston means and adapted for communication with said second passage means,

said port means comprising a substantially circular aperture encompassing a major area of the top of said piston and surrounded and defined by a substantially annular, beveled valve seat means,

a substantially circular, beveled outer periphery, substantially planar top, valve disc means mounted on the top of said piston means for limited axial, essentially frictionless floating movement,

the beveled surfaces of said valve seat means and of said valve disc means being adapted to form a fluid seal on the compression stroke of said piston means to close off said second passage means from said compression chamber,

said floating movement of said valve disc means functioning to provide said suction gas port means with suitable open dimensions to allow a high volume flow of low-pressure refrigerant gas into said compression chamber during the suction stroke of said piston means,

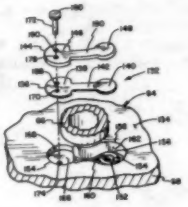
said valve seat means and said valve disc means being dimensioned to allow the top of said piston means and the top of said valve disc means to lie in substantially the same plane on the compression stroke.

4,955,797

VALVE INDEXING FOR A COMPRESSOR

Russell A. Cowen, Brooklyn, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Feb. 15, 1989, Ser. No. 311,108
Int. Cl.[5] F04C 29/08
U.S. Cl. 418—15 20 Claims



1. In a compressor assembly including a crankcase, a compression chamber within said crankcase, means for compressing fluid within said compression chamber, and at least one port in fluid communication with said compression chamber and extending through said crankcase, said port having an opening on a valve-supporting surface of said crankcase wherein a portion of said surface surrounding said opening comprises a valve seat, a valve assembly for promoting fluid flow through said port in a direction exiting said opening, said valve assembly comprising:

a reed valve including a substantially round mounting end portion having an outer peripheral edge, an opposite free end portion configured to be capable of operably covering said valve seat, and an elongated intermediate portion extending generally along a central longitudinal axis of said valve;

a substantially round well in said valve-supporting surface having a bottom surface and a side surface, the diameter of said mounting end portion being slightly less than the diameter of said well such that said mounting end portion is received within said well, said well being spaced from said opening a distance such that when the longitudinal axis of said valve is properly oriented said free end portion is operably situated over said valve seat; and

indexing means for properly orienting said mounting end portion within said well such that said free end portion is maintained operably situated over said valve seat, said indexing means comprising an eccentrically located aperture in said mounting end portion and a retainer pin member extending from said well bottom surface, said retainer pin member being received through said aperture when said mounting end portion is properly oriented, and said mounting end portion being limited in any pivotal movement about said retainer pin member by stopping engage-

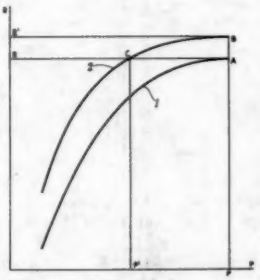
ment of said outer peripheral edge with said side surface of said well.

4,955,798

PROCESS FOR PRETREATING METAL IN PREPARATION FOR COMPACTING OPERATIONS

Vincenzo Musella, and Mario D'Angelo, both of Arzano, Italy, assignors to Nuova Merisinter S.P.A., Italy

Filed Sep. 27, 1989, Ser. No. 413,376
Claims priority, application Italy, Oct. 28, 1988, 48510 A/88
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—31 10 Claims



1. A process for pretreating metallurgical powders in preparation for compacting or densifying comprising the steps of

mixing said metallurgical powders with a solid lubricant to form a mixture

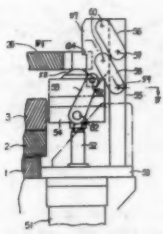
heating said mixture prior to compacting or densifying to a temperature above room temperature and below the softening temperature of the solid lubricant.

4,955,799

METAL MOLD CENTERING AND CLAMPING DEVICE IN A TIRE VULCANIZING MACHINE

Hideaki Katayama; Toshifumi Murakami, both of Nagasaki; Koji Soeda, Kobe; Yoshiya Kubota; Shoji Okamoto, both of Toyota; Akinori Kubota, Kobe; Michihito Kobayashi, Toyota; Masaaki Ijiri, Aichi; Susumu Ozawa, Hekinan, and Kiyoshi Tomosada, Toyota, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Sumitomo Rubber Industries, Ltd., Hyogo, both of, Japan

Filed Nov. 9, 1989, Ser. No. 433,775
Claims priority, application Japan, Nov. 11, 1988, 63-283801
Int. Cl.[5] B29G *33/00*
U.S. Cl. 425—47 4 Claims



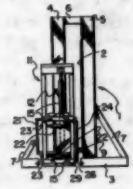
1. In a tire vulcanizing machine having a vulcanizing machine frame and a metal tire mold formed of upper and lower metal molds supportable on the frame, a metal mold centering device for centering the mold in the machine, said device comprising: a plurality of hydraulic cylinders each having a piston rod equipped with a non-directional bearing at its top portion, said cylinders mounted on the vulcanizing machine frame close to an outer circumference of the metal mold when the mold is supported on the frame; and a centering member connected, at a radially outer portion thereof, to the vulcanizing machine frame via parallel links and at a bottom portion thereof, to said piston rod via a link; said centering member defining a centering surface at a radially inner portion thereof and the lower metal mold defining a centering surface at the outer circumference thereof, said centering surfaces opposed to each other so as to be engageable with one another to effect centering of the mold when the lower metal mold is disposed on said non-directional bearing and said piston rod is lowered.

4,955,800

APPARATUS FOR PRODUCING PREFABRICATED FOAM-INSULATED WALLS

Terrence M. Rothwell, Morrefield, and George P. Rothwell, Mount Forest, both of Canada, assignors to Tampa-Hall Limited, Ontario, Canada

Continuation-in-part of Ser. No. 86,459, Aug. 18, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 315,056
Claims priority, application Canada, Aug. 14, 1987, 544,621
Int. Cl.[5] B29C *29/10*
U.S. Cl. 425—63 5 Claims



1. For filling a sheathing-backed, one-side-open stud wall with foam, a machine comprising:

a main frame, including a substantially vertical backplate against which the sheathing bears;

a dam parallel to the backplate, moveable towards and away from and vertically with respect to the backplate;

means for holding the dam against the stud wall when the stud wall is positioned with its sheathin against the backplate, said means comprising hydraulic cylinders connected between the dam and the main frame, and wherein said hydraulic cylinders have adjustable end mounts whereby they may be set to reach their full extension with the dam at a distance from the backplate corresponding to the stud wall and sheathing thickness; and

means for moving the dam vertically while it is so held against the stud wall;

one side of said machine between the backplate and the dam defining an opening constituting a stud wall entrance area, and the other side of said machine between the backplate and the dam defining another opening constituting a stud wall exit area;

whereby a stud wall may be introduced at the entrance area and positioned between the backplate and the dam, the dam may then be moved against a bottom portion of the open side of the stud wall and held there, foam may then be introduced between the backplate and the dam to fill the stud wall therebetween, the dam may then be moved upwardly, additional foam may then be introduced to fill a higher portion of the stud wall, and so on to completion of filling, whereupon the dam may then be moved away from the backplate, and the filled portion of the stud wall may then be advanced towards the exit area.

4,955,801

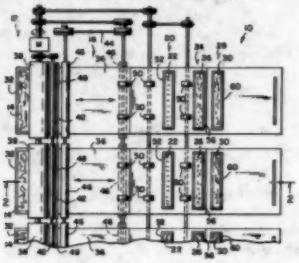
AUTOMATIC APPARATUS FOR MAKING STRUDEL TYPE PASTRY

Herb Kessler, 173 W. 78 St., New York City, N.Y. 10024, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007

Filed Jan. 23, 1989, Ser. No. 300,313

Int. Cl.[5] B29C *39/06*; A21C *3/10, 11/10*

U.S. Cl. 425—92 **5 Claims**



1. An apparatus for forming thin pastry with a filling such as strudel prior to rolling, cutting and baking which comprises:

(a) a conveying platform;

(b) means for mixing ingredients together for making the dough and conveying said dough forward on to said platform;

(c) means for providing a carrying film for said dough;

(d) means for spreading a thin layer of dough upon said film;

(e) means for moving said spreading means forward;

(f) means for covering the dough with a film of oil, forward of said spreading means;

(g) means for moving said dough forward from said means for covering said dough with a film of oil;

(h) means for depositing the dough with other ingredients;

(i) means for depositing filling on said dough;

(j) means for moving said dough forward to receive said filling;

(k) means for synchronizing all said means for proper timing.

4,955,802

BLOW-EXTRUDING A MULTILAYER SYNTHETIC-RESIN TUBE

Hartmut Halter, Troisdorf, and Willi Schnell, Köln, both of Fed. Rep. of Germany, assignors to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,188

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820530

Int. Cl.[5] B29C *55/28*

U.S. Cl. 425—72.1 **9 Claims**

1. An apparatus for blow extruding a synthetic-resin tube, the apparatus comprising:

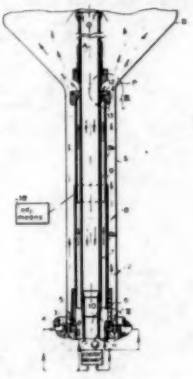
means including a nozzle having an annular nozzle mouth generally centered on a longitudinal axis for longitudinally outwardly extruding a tubular synthetic-resin strand;

an inner stabilizing tube extending longitudinally outward from the nozzle within the mouth thereof and having an outer end spaced a predetermined longitudinal distance from the nozzle mouth;

an outer stabilizing tube surrounding the inner tube and defining a longitudinal passage therewith, extending longitudinally outward from the nozzle within the mouth thereof, and having an outer end lying between the outer end of the inner tube and the nozzle mouth and defining with the inner tube an annular inner mouth, the passage opening outward at the inner mouth between the outer ends, the tubes being radially closed between the nozzle mouth and their outer ends;

means for feeding cooling air to a space defined between the strand where it emerges from the nozzle mouth and the outer tube for flow of this cooling air longitudinally outward between the strand and the outer tube;

means for feeding cooling air to the passage at the nozzle mouth for flow from the inner mouth at the outer end of



the outer tube so as to mix and form turbulence with the air moving longitudinally outward between the strand and the outer tube and thereby expand the strand transversely at the annular inner mouth; and

means connected to the inner tube for withdrawing the cooling air from within the strand by drawing the cooling air into the outer end of the inner tube and longitudinally backward through the inner tube.

4,955,803

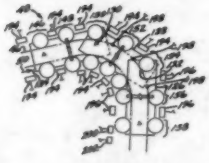
APPARATUS FOR FORMING FIBER COMPOSITE MATERIALS

Alan K. Miller, Santa Cruz; Karthik Ramani, Stanford, and Micha M. Gur, Palo Alto, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Palo Alto, Calif.

Continuation-in-part of Ser. No. 825,337, Feb. 3, 1986, Pat. No. 4,777,005. This application Oct. 18, 1988, Ser. No. 259,256

Int. Cl.[5] B29C *53/04*

U.S. Cl. 425—145 **19 Claims**



1. An apparatus for introducing and propagating bends in a composite material workpiece having a longitudinal direction and a transverse direction defined therefor, comprising:

deformation means for deforming the workpiece in the transverse direction, as the work piece is moved in the longitudinal direction, the deformation means including a pair of opposing compound disk rollers each rotatably mounted on an axle lying parallel to the longitudinal

direction, and spaced apart so that the workpiece passes between the compound rollers and in contact therewith.

a first single compound disk roller rotatably mounted on an axle lying parallel to the longitudinal direction, the compound disk rollers permitting the workpiece to roll thereover in both the longitudinal direction and the transverse direction;

means for moving the workpiece between the pair of opposing compound rollers, both in the longitudinal direction and in the transverse direction; and

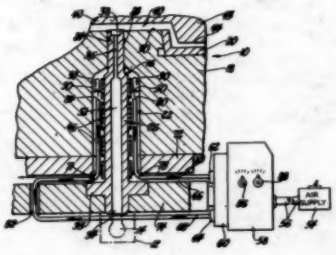
means for moving the axle of the first single compound disk roller in a circular arc whose center is at the axis of rotation of a first one of the pair of opposing compound disk rollers and whose radius is equal to the sum of the radius of the first one of the pair of opposing compound disk rollers plus the radius of the first single compound roller plus the thickness of the composite material workpiece.

4,955,804

TOOL FOR MOLDING PLASTIC ARTICLES

William A. Martell, Sterling Heights, Mich., and Colin R. Brown, Grange, Australia, assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 19, 1989, Ser. No. 367,916
Int. Cl.[5] B29C *45/20, 45/73*
U.S. Cl. 425—548 **5 Claims**



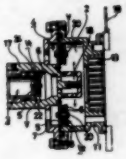
1. A mold for molding objects from a heated charge of plastic material fed thereto comprising a mold body, one side of said mold body defining a mold face, a passage in said mold body extended into said face, said passage bounded by an internal wall within said body, a hot drop assembly operatively mounted within said passage, said hot drop assembly conducting and heating said charge of plastic material fed thereto for delivery to said face of said mold, said hot drop assembly having an elongated injector body being mounted within said passage and having an opening therethrough for said charge of plastic material, heater means associated with said injector body for further heating of the heated charge of plastic material within said hot drop assembly, said hot drop assembly being spaced at least in part from said internal wall and gas cooing means for forcing a flow of cooling gas directly between said hot drop assembly and said internal wall to effect internal cooling of said mold by transferring heat energy from said opening and from areas of said mold body surround said passage to an exhaust passage to thereby lower the operating temperature of said mold so that high heat energy will not be conducted by said mold to said face and damage an object being molded.

4,955,805

CHECK-VALVE MECHANISMS FOR A PULSE COMBUSTION APPARATUS

Katsusuke Ishiguro, Nagoya; Tsuneyasu Hayakawa, Kani, and Nobuyoshi Yokoyama, Toyoake, all of Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 13, 1989, Ser. No. 310,335
Claims priority, application Japan, Jun. 4, 1988, 63-137963
Int. Cl.[5] F23C *11/04*
U.S. Cl. 431—1 **2 Claims**



1. A check-valve mechanism of a pulse combustion apparatus for passing air into a mixing chamber, comprising

(i) a partition wall separating an air inlet chamber and said mixing chamber from each other,

(ii) a plurality of associated rear discs of relatively small diameters spaced apart from said partition wall and located inside said mixing chamber,

(iii) a plurality of associated front discs, or valve members, of substantially the same diameters as said rear discs which are located between said partition wall and said rear discs and are each formed of woven fabric of carbon fiber coated with fluorocarbon resin,

(iv) each said rear disc, the valve member associated therewith, and a circular portion of said partition wall which overlies the valve member as viewed from the side of said air inlet chamber each having a central opening and being joined together by bolt means which passes through the central openings thereof,

(v) the circular portions of said partition wall each having around the central openings thereof a plurality of radially-extended elongated openings for passing air from said air inlet chamber into said mixing chamber,

(vi) each said rear disc having around the central opening thereof a plurality of small circular openings which do not overlap the elongated openings of the circular portion of said partition wall corresponding to the rear disc as viewed from an axial direction, and

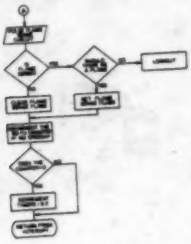
(vii) each said valve member being axially movable between said partition wall and the associated rear disc, thereby opening and closing said elongated openings of the associated circular portion of said partition wall.

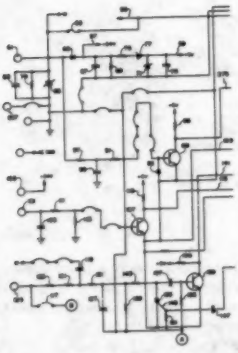
4,955,806

INTEGRATED FURNACE CONTROL HAVING IGNITION SWITCH DIAGNOSTICS

Michael T. Grunden; Stephen E. Youtz, and Eugene P. Mierzwinski, all of Fort Wayne, Ind., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.

Division of Ser. No. 95,506, Sep. 10, 1987, Pat. No. 4,842,510.
This application May 9, 1989, Ser. No. 349,296
Int. Cl.[5] F23N *5/00*
U.S. Cl. 431—24 **4 Claims**





1. An integrated digital electronics burner control for a gas burner of the type having at least one gas valve control relay operable upon command from the integrated burner control to open a gas valve and supply gas to a burner combustion chamber comprising:

a flame sensor for sensing for the presence of a flame in the combustion chamber; and

means for sending a sequence of pulses to the flame sensor and for receiving back from the flame sensor the same sequence of pulses thereby normally indicating the presence of a flame.

4,955,807

SPIRAL COIL CANDLE HOLDER FOR PUMPKINS AND OTHER SUBSTRATES

Allen Chance, Mill Valley, and William Gray, Topanga, both of Calif., assignors to Concept Manufacturing, Topanga, Calif.

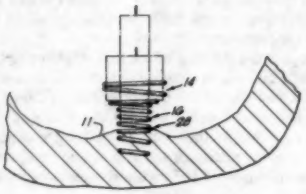
Filed Dec. 2, 1988, Ser. No. 278,812
Int. Cl.[5] F23D *3/16*
U.S. Cl. 431—296 **9 Claims**

1. A pumpkin candle holder made from a spiral coil comprising:

an upper spiral coil section having a diameter sized to receive votive candles having various diameters;

a middle spiral coil section connected to said upper spiral coil section and having a diameter smaller than the diameter of said upper spiral coil section, said middle spiral coil section sized to receive candles of varying diameters;

a bottom spiral coil section connected to said middle spiral coil section for embedding said pumpkin candle holder into a pumpkin;



said spiral coil also including a closed coil stop for limiting the distance that said candle holder can be embedded into the pumpkin; and

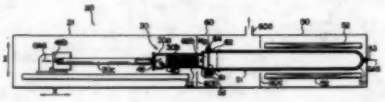
a free end on the upper spiral coil section which turns inward towards the aperture created by said upper spiral coil section such that said free end protrudes into a candle placed in said candle holder, thereby further securing said candle in said candle holder.

4,955,808

METHOD OF HEAT-PROCESSING OBJECTS AND DEVICE AND BOAT FOR THE SAME

Kazuhisa Miyagawa, Shiroyama, Japan, assignor to Tel Sagami Limited, Kanagawa, Japan

Filed Mar. 9, 1989, Ser. No. 321,267
Claims priority, application Japan, Mar. 9, 1988, 63-55730
Int. Cl.[5] F27D *3/00*
U.S. Cl. 432—5 **5 Claims**



1. A method of heat-processing objects comprising:

forming a purge tube means which encloses the objects by supporting a boat means, on which the plural objects are mounted, by a carrier arm means to define a space on the upper side of the objects while defining another space on the lower side of the objects when the boat means is to be loaded into and unloaded from a heat process furnace means by the moving carrier arm means or either when the boat means is to be loaded into the heat process furnace means or when it is to be unloaded from the heat process furnace means,

moving the carrier arm means to communicate the purge tube means with the heat process furnace means,

supplying non-oxidizable gas into both of the purge tube means and the heat process furnace means, keeping them connected to each other,

pre-heating or cooling the objects to a predetermined temperature range, and

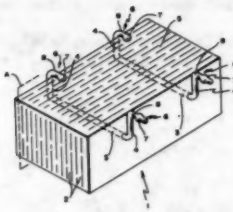
loading the purge tube means into the heat process furnace means or unloading the purge tube means from the heat process furnace means.

4,955,809

LINING ELEMENT AND STRUCTURE FOR HEAT TREATMENT FURNACES

Raimo Viertola, Viinimöisenkatu 34 B, SF-33540 Tampere, Finland

PCT No. PCT/FI88/00080, § 371 Date Jan. 26, 1989, § 102(e) Date Jan. 26, 1989, PCT Pub. No. WO88/09472, PCT Pub. Date Dec. 1, 1988
PCT Filed May 25, 1988, Ser. No. 306,019
Claims priority, application Finland, May 26, 1987, 872317
Int. Cl.[5] F27D *1/00*
U.S. Cl. 432—247 12 Claims



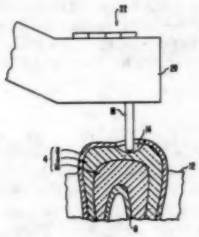
1. Lining element for heat treatment furnaces, comprising lining material consisting of insulating material, an elongate supporting element for transversely piercing the lining material, elongate fastening means for attachment of the element to the interior furnace wall provided at both ends of the supporting element, the free ends of the fastening means being provided with projections extending transversely to the longitudinal direction of the fastening means at the height of a planar interior surface of the element, which surface will be closest to the interior furnace wall.

4,955,810

DENTIN THICKNESS MONITOR

Guy Levy, 49, rue Croix de Regnier, 13004 Marseille, France

Filed Feb. 13, 1989, Ser. No. 309,560
Claims priority, application France, Mar. 7, 1988, 88 03089
Int. Cl.[5] A61C *19/04*
U.S. Cl. 433—72 14 Claims



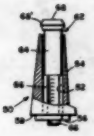
1. A method for measuring the thickness of the dentin layer of a tooth in a patient, at a region where the dentin is exposed, during a dental treatment, comprising the steps of: establishing an electric voltage between the dentin at the region where it is exposed and a region of the patient's body spaced from the tooth to create an electric current flow through body tissue between those regions; monitoring the current flow to produce an indication of at least electrical resistance values above 0.5 MΩ between those regions; and converting the electrical resistance indication into an indication of the thickness of the dentin layer.

4,955,811

NON-ROTATIONAL SINGLE-TOOTH PROSTHODONTIC RESTORATION

Richard J. Lazzara, Lake Worth, and Keith D. Beaty, West Palm Beach, both of Fla., assignors to Implant Innovations, Inc., West Palm Beach, Fla.

Filed Jun. 23, 1988, Ser. No. 210,421
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 15 Claims



1. A set of attachments for use in fabricating a prosthodontic restoration intended to be fitted non-rotationally on a dental implant fixture having a threaded bore axially disposed in it and opening centrally through its gingival end, said fixture having at said gingival end anti-rotation means to fix said restoration when fitted against rotation relative to said fixture around a longitudinal axis running successively through said bore and said restoration, said set of attachments comprising an elongated impression coping having at a first one of its ends anti-rotation means cooperative with said anti-rotation means of said fixture upon attaching said coping end-wise to said gingival end of said fixture so as to fix said coping against rotation around said axis relative to said fixture, said coping having a smooth bore extending through it from said first one of its ends to the second one of its ends concentric with and embracing said axis for passage of a bolt useful to attach said coping to said fixture via said threaded bore, said coping having index means to fix said coping against rotation around said axis when encased in resilient impression material, a laboratory analog of said fixture having at one end a replica of said anti-rotation means of said fixture and a body extending from said one end including means to fix said analog in a rigid dental model, and core means on which to fabricate said restoration, said core means having at one end a replica of said anti-rotation means of said impression coping, and extending between its ends a bore for passage of a bolt useful to attach said core means to said fixture via said threaded bore.

4,955,812

VIDEO TARGET TRAINING APPARATUS FOR MARKSMEN, AND METHOD

Banford R. Hill, 935 S.W. 19th Ave., Portland, Oreg. 97209

Filed Aug. 4, 1988, Ser. No. 228,040
Int. Cl.[5] F41F *27/00*
U.S. Cl. 434—16 10 Claims

8. A video target training apparatus for marksmen comprising:

a gun-resembling member having a stock,

a barrel-like portion on the stock having a forward end,

trigger means for firing said gun-resembling member,

a front sight on said barrel-like portion,

a target immediately adjacent to and not more than two inches from the forward end of said barrel-like portion,

an optical system on said gun-resembling member including a rear sight arranged to reflect a combined range of said target and said front sight when said gun resembling member is aimed at said target in said immediately adjacent position,

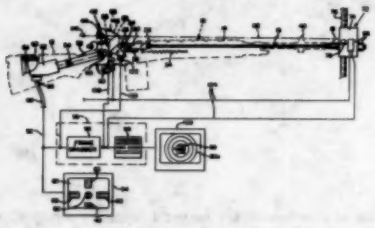
a video camera receiving said target and said front sight image,

electric circuit,

monitor means in said electric circuit for showing said combined image of said target and said front sight,

display means in said electric circuit for receiving said target and front sight image from said camera and for causing said combiner image to be displayed visually on said monitor means,

frame grabber means in said electric circuit arranged to hold several frames and display a single frame on said monitor means,



switch means in said electric circuit associated with said trigger means for activating said frame grabber means when said trigger means is pulled,

and powered plunger means on said target which faces the forward end of said barrel-like portion and spaced in physically separate relation from said gun-resembling member and which is operated by said switch means and arranged to forcefully strike said forward end of said barrel-like portion when said trigger means is pulled, to provide a simulated recoil in said gun resembling member said power plunger means disposed under and immediately adjacent said target, whereby said plunger means provides said striking force against said barrel-like portion.

4,955,813

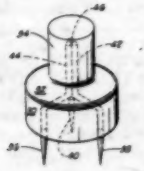
MULTI-PRONGED THUMBTACK

Stephen H. Fochler, 95 Greentree Rd., Chagrin Falls, Ohio 44022

Filed Sep. 21, 1989, Ser. No. 410,510

Int. Cl.[5] F16B *15/00*

U.S. Cl. 411—457 **2 Claims**



2. A thumbtack which comprises:

a synthetic resin head comprising:

a generally cylindrical base portion having a substantially monoplanar surface at one side thereof;

a generally cylindrical neck portion of smaller diameter than said base portion projecting from the opposite side of said base portion from the side at which said monoplanar surface is located; and

a shoulder between said neck portion and said base portion; and

three metallic tines including three portions having substantially parallel axes projecting from said monoplanar side of the base portion of said head, and projecting in a direction which is substantially perpendicular to said monoplanar surface, each of said tines having a generally L-shaped portion embedded in said base portion of said synthetic resin head, and said tines collectively further including three centrally located contiguous shaft portions extending from said L-shaped portions and embedded in said generally cylindrical neck portion of said synthetic resin head.

4,955,814

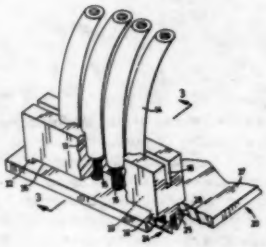
ELECTRICAL CONNECTOR DEVICE

Craig Christie, Toronto, and Michael Nykoluk, King City, both of Canada, assignors to Electro Rubber Limited, Toronto, Canada

Filed Dec. 26, 1989, Ser. No. 456,961

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—77 **8 Claims**



1. A device for positioning wire conductors relative to a printed circuit board, comprising:

a body of an electrically insulating material defining a plurality of apertures through it for receiving and holding a plurality of wire conductors so that bared ends of the wires extend through the body, each aperture having a first portion sized to receive an insulated wire conductor and a second portion of a smaller diameter being sized to receive a bared wire end, the body defining a longitudinal slot along which the apertures are centered and the depth of which slot does not extend to the second portions of the apertures; and

means coacting with the body and circuit board for attaching the body to the board so that the wire ends are positioned relative to the board for attachment to it, the board having holes arranged for receiving the wire ends and attaching means.

4,955,815

CONNECTION SOCKET, IN PARTICULAR TO CONNECT COAXIAL PLUG, WITH FRONT MOUNTING

Hubert Gate, Tierce, and Dominique Huerre, Angers, both of France, assignors to Societe Electronique de la Region Pays de Loire, Paris, France

Filed Jun. 1, 1989, Ser. No. 360,144

Claims priority, application France, Jun. 3, 1988, 8807406

Int. Cl.[5] H01R *13/627*

U.S. Cl. 439—350 **3 Claims**

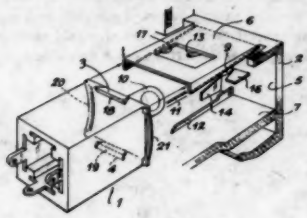
1. A connection socket means for connection of a coaxial plug through an exterior wall of a structure by a hole in said structure wall, said means comprising:

at least one plane wall formed on the interior surface of said structure wall and perpendicular to said structure wall, said at least one plane wall having a slot and said at least one plane wall being flexible in the zone of said slot;

a connector socket having a body including at least one snap-fastened tappet cooperating with said at least one slot to retain said connection socket, said connection socket

further including a smooth sleeve extending along a first axis outward from said body;

a guide means including a plurality of ribs formed on said interior surface of said structure wall in proximity to said



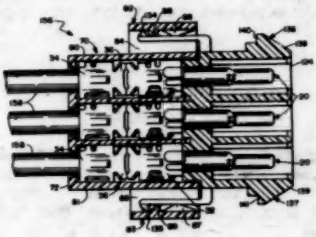
hole for aligning said smooth sleeve in conjunction with said hole and wherein said ribs are formed so that said smooth sleeve is fitted in said hole with one end of said smooth sleeve being substantially in the same plane as the exterior surface of said structure wall.

4,955,816

ELECTRICAL CONNECTOR SYSTEM AND INSULATION DISPLACEMENT TERMINALS THEREFOR

James T. Roberts, Oak Park, and Raymond A. Silbernagel, Naperville, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Apr. 20, 1989, Ser. No. 340,635
Int. Cl.[5] H01R *4/24*
U.S. Cl. 439—421 **10 Claims**



1. An electrical connector system including:

a plurality of male terminals each having a forward mating end and a rearward wire mounting end;

a plurality of female terminals each having a forward mating end to mate with the forward mating end of the male terminal and having a rear wire mounting end substantially identical to said wire mounting end of the male terminals;

mating insulative receptacle housing means and plug housing means, each having a forward end, a rear end and at least one terminal receiving cavity extending therebetween, said cavities mounting at least one of said terminals therein;

the improvement comprising:

each of said receptacle and plug housing means including separate cooperating forward and rear housing members;

said forward receptacle and plug housing members each including said forward end, a rear mounting end having a first locking structure and at least a portion of said terminal receiving cavity extending therebetween to mount the forward mating ends of at least one of said female terminals and male terminals therein;

said rear receptacle and plug housing members each being substantially identical and including identical second locking structures cooperating with said first locking structure so that the identical rear housing members are modular and are interchangeably mountable to the rear mounting end of either forward housing member;

the rear wire mounting end of each said terminal comprises a forward wire engaging section, a rearward wire engaging section and a collapsible insulation displacement contact section disposed therebetween, said modular rear housing member being mounted for telescoping movement relative to said forward housing member for axially collapsing the insulation displacement contact sections into electrical contact with a wire inserted therein; and

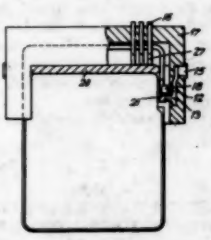
said modular rear housing member includes at least one wall having a generally planar external surface, at least one bridging wall disposed in spaced relationship to said planar surface and said second locking structure having first and second locking bosses extending from said bridging wall toward said generally planar surface, said first locking structure of the forward plug housing member having deflectable latches selectively and alternately engageable with the locking bosses extending from said bridging wall, whereby engagement of one of said latches with said first locking boss securely mounts a selected one of said front housing to said modular rear housing and retains at least one of the terminals therebetween, and whereby movement of the selected front housing into position for locking engagement of the latch with the second locking boss is operative to collapse the insulation displacement contact section of each said terminal therein.

4,955,817

CONSTRUCTION FOR REMOVING ELECTRONIC CHARGES IN CONNECTORS

Hiroshi Sugai, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 308,870
Claims priority, application Japan, Feb. 12, 1988, 63-17295[U]
Int. Cl.[5] H01R *13/453*; H05K *1/14*
U.S. Cl. 439—60 **7 Claims**



1. In a construction for removing electrical charges generated in a data input device when the input device including input terminals connected to the circuitry of the input device is electrically coupled to a connector of an electronic apparatus including connector terminals connected to the electronic circuitry of the electronic apparatus, the improvement comprising:

at least one electrically conductive contacting member for removing electric charges generated in the input device, said contacting member disposed in the connector for contacting an electrically conductive portion of the input device and the input device including a contact portion for cooperating with the contacting member prior to the input terminals of the input device being connected to the connector terminals of the connector, the input device

including a shutter member displaceable between a first closed position covering the input terminals and a second open position exposing the input terminals, the shutter adapted to be displaced to the second open position when inserted into the connector, the connector including an opening projection and the shutter including a shutter projection for cooperating with the opening projection to displace the shutter to the second open position when the input device is inserted into the connector.

4,955,818

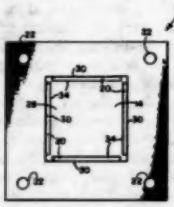
ELECTRICAL COMPONENT CONNECTOR

Andrew H. Strange, Eagleville, Pa., and William P. Sharpe, Newport, R.I., assignors to Elastomeric Technologies, Inc., Hatboro, Pa.

Filed Aug. 4, 1989, Ser. No. 389,529

Int. Cl.[5] H01R 23/72

U.S. Cl. 439—66 **10 Claims**



1. An electrical component connector comprising:

a housing having;

(a) a recess adapted to receive an electrical component having contact leads, said recess defined by a base surface and a wall structure disposed perpendicular to said base surface, and

(b) at least one elongated passage extending through said housing from a first opening at said recess along said wall structure to a second opening at an external bottom surface of said housing, said second opening being wider than the top of said passage

a strip of elastomeric elements having a cross section corresponding to the cross-section of said elongated passage;

(a) fitted within said passage in said housing to present to said contact leads of said electrical component when inserted in said recess in said housing a contact surface which extends along said wall structure and is perpendicular to said base surface, and

(b) extending through said passage of said external surface of said housing.

4,955,819

PLUG CONNECTOR HAVING BENT CONTACT POSTS FOR INSERTION INTO PRINTED CIRCUIT BOARD HOLES

Dietmar Harting, Espelkamp; Hans Nagel, Porta Westfalica, and Günter Pape, Bielefeld, all of Fed. Rep. of Germany, assignors to Harting Elektronik GmbH, Espelkamp, Fed. Rep. of Germany

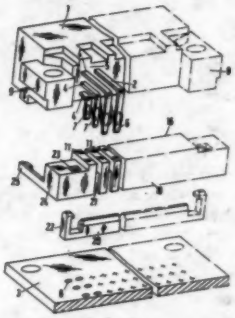
Filed Mar. 13, 1989, Ser. No. 322,738

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810471

Int. Cl.[5] H01R 23/68

U.S. Cl. 439—79 **11 Claims**

1. A plug connector for connection to a printed circuit board comprising an insulating member, contact elements each having a first section extending from said insulating member in a first direction and each having a second section which is bent relative to said first section to extend in a second direction generally perpendicular to said first direction, a plurality of said first sections of said contact elements being spaced from one another in a direction perpendicular to said first direction, each of said second sections having contact posts adapted to be inserted in openings in a printed circuit board, an insulating supplemental part formed separately of said insulating member, mounting means on said supplemental part and on said insulating member for mounting said supplemental part on said insulating member in an assembled position, said supplemental part having spaced slots which receive said contact elements when said supplemental part is in said assembled position, said



supplemental part having spaced crosspieces which extend across said slots and which support said first sections of each of said contact elements when said supplemental part is mounted in said assembled position on said insulating member, said crosspieces having a dimension in a direction perpendicular to said first direction corresponding to said space between said plurality of first sections of said contact elements to thereby provide support between said plurality of first sections of said contact elements to prevent deflection of said contact elements as said contact posts are inserted into said openings.

4,955,820

T-LEG SMT CONTACT

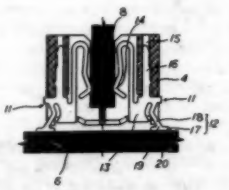
Shoji Yamada, Tokyo, and Tomoo Yamada, Yokohama, both of Japan, assignors to Molex Incorporated, Lisle, Ill.

Filed Dec. 7, 1989, Ser. No. 447,350

Claims priority, application Japan, Dec. 9, 1988, 63-160024[U]

Int. Cl.[5] H01R 4/02, 9/09

U.S. Cl. 439—83 **6 Claims**



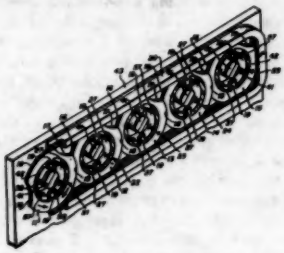
1. Surface-mounted component's contact having a soldering portion, which contact is to be mounted to the surface of a printed circuit board 6 and is to be electrically connected to a conductor, characterized in that said soldering portion 12 comprises a flat foot 17 and a leg 18, which is integrally connected to and rising from the midportion of said foot 17, generally shaped in the form of an inverted "T", said soldering portion 12 being a metal piece made by stamping a metal blank.

4,955,821

METHOD FOR CONTROLLING CONNECTOR INSERTION OR EXTRACTION SEQUENCE ON POWER DISTRIBUTION PANEL

Allen J. Bernardini, Southbury, Conn., assignor to Litton Systems, Inc., Watertown, Conn.

Filed Jul. 10, 1989, Ser. No. 377,118
Int. Cl.[5] H01R *13/44*
U.S. Cl. 439—133 **20 Claims**



1. A coupling guard which insures the coupling of a plurality of plugs and receptacles in a predetermined sequence in which the plugs must be rotated in one direction to complete an electrical connection to the receptacle and rotated in the opposite direction to break the electrical connection, the coupling guard comprising:

first and second receptacles;

first and second cam rings surrounding the first and second receptacles;

a first cam surface having a convex shape and a first clearance notch on the outer surface of the first cam ring;

a second cam surface and a locking notch on the outer surface of the second cam ring the locking notch having a concave shape which is complimentary to the shape of said first cam surface, wherein the cam surface of the first cam ring prevents rotation of the second cam ring when the first cam surface engages the locking notch of the second cam ring, and wherein the second cam ring is free to turn when the first clearance notch engages the second cam surface on the second cam ring; and

wherein the second cam surface engages the first clearance notch when the second cam ring rotates and prevents rotation of the first cam ring without first rotating the second cam ring to remove the second cam surface of the second cam ring from the clearance notch of the first cam ring.

4,955,822

TWO WAY EXTENSION CORD

Robert O. Look, and Deborah M. Pittman, both of 624 Easy St., Holly Hill, Fla. 32117

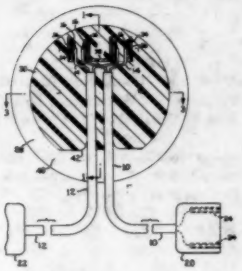
Filed Jan. 8, 1990, Ser. No. 461,823
Int. Cl.[5] H01R *19/16*
U.S. Cl. 439—505 **5 Claims**

1. A two way electrical extension cord comprising: two flexible electrical cables, each having at least two insulated wires running internally therealong, the wires of one cable not being directly attached to the wires of the other cable; each cable having first and second ends; each wire having first and second ends located at the corresponding ends of the associated cable;

a female electrical plug attached to the first end of each cable, each plug comprising two insulated electrical socket elements electrically connected to the first ends of the wires in the associated cable;

a single male electrical plug comprising a dielectric housing and two insulated electrical prong elements extending therefrom;

said electrical cables having their second ends extending into said dielectric housing; one wire in each cable having its second end electrically connected to one prong element, the other wire in each cable having its second end electri-



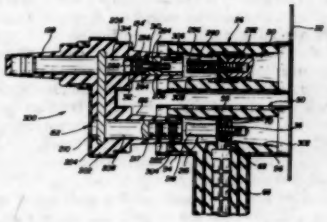
cally connected to the other prong element, whereby the wires in one said cable are in electrical parallelism with the wires in the other cable.

4,955,823

600-AMP HOT STICK-OPERABLE SCREW AND PIN-AND-SOCKET ASSEMBLED CONNECTOR SYSTEM

Glenn J. Luzzi, Mt. Bethel, Pa., assignor to Amerace Corporation, Parsippany, N.J.

Filed Oct. 10, 1989, Ser. No. 419,514
Int. Cl.[5] H01R *31/08*
U.S. Cl. 439—507 **9 Claims**



1. A high voltage hot stick-operable screw and pin-and-socket assembled connector system for selectively coupling together a source of high voltage and a high voltage cable comprising:

a support member;

an apparatus bushing mounted upon said support member and electrically coupled to a source of high voltage;

a high voltage cable coupled to a connector mounted upon said support member;

selectively applicable pin-and-socket screw-operated link member when applied in a first arrangement joining said apparatus bushing to said cable to apply high voltage thereto or, when not applied between said apparatus bushing and said cable, providing a visible separation between said bushing and said cable;

said pin-and-socket, screw-operated link member comprising a first and a second housing assembly, one of said first and second housing assemblies containing a socket to mate with a pin in said apparatus bushing or said cable connector and the other assembly containing a screw-operated member to mate with the other of said apparatus bushing or said cable connector;

a conductive metallic buss coupling said socket and said

screw-operated member for electrically coupling same; and

a third housing assembly providing access to said screw-operated member for selectively applying said link member in said first arrangement and for withdrawing said link member from such arrangement.

4,955,824

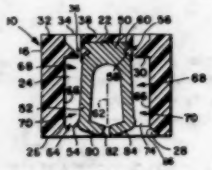
TWO PIN SHUNT

David A. Pretchel, 8549 Plank Rd., Mentville, Ohio 44064; Howard J. Venaleck, 232 Wintergreen Hill, Painesville, Ohio 44077, and John T. Venaleck, 2132 Chimney Ridge, Madison, Ohio 44057

Division of Ser. No. 38,228, Apr. 14, 1987, Pat. No. 4,795,602, and a continuation-in-part of Ser. No. 841,669, Mar. 19, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 269,589

Int. Cl.[5] H01R *31/08*

U.S. Cl. 439—510 **11 Claims**



1. An electrical shunt comprising contact means for electrically connecting plural electrical members, said contact means including a unitary contact body having a base portion and a pair of compliant contacting portions extending from said base portion for electrically connecting respectively to plural electrical members, and housing means for supporting said contact means in operative position for effecting such connecting function with respect to the plural electrical members inserted with respect to said housing means and compliant contacting portions, said housing means including a molded body of electrically nonconductive material having therein an open chamber in which at least one of said compliant contacting portions is movable and exposed for electrically connecting with a respective one of the plural electrical members inserted into said chamber through an open end of said chamber at one side of said molded body, and said molded body being molded to and about said base portion of said unitary contact body to anchor said unitary contact body in said molded body.

4,955,825

ELECTRICAL FIXTURE

John E. Groth, Cleveland Heights; Martin F. Delmore, Seven Hills, and Raymond S. Laughlin, Cuyahoga Falls, all of Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed Jan. 14, 1987, Ser. No. 3,451

Int. Cl.[5] H01R *13/60*

U.S. Cl. 439—535 **9 Claims**

1. An electrical fixture for mounting a cover plate upon a wall over a wall opening located in the panel of such wall with fasteners, comprising a plate having a front surface, a rear surface, a major opening and a pair of fastener openings extending from said front surface through to said rear surface, said major opening having top, bottom and side edges, and one of said fastener openings being located adjacent said top edge and the other of said fastener openings being located adjacent said bottom edge, said side edges of said major opening each including a protruding flange which serves to align and secure said electrical fixture within such wall opening, said top and bottom edges each including a deformable finger extending essentially normal thereto in the proximity of said respective fastener opening which is adapted for insertion and deformation within such wall opening, said deformable fingers each including a slot which upon deformation of the finger around such panel and within such wall opening aligns with said respective fastener opening through a range of thicknesses of such panel such that upon insertion and driving of such fasteners within said fastener openings such fasteners are not obstructed by said deformable fingers, said major opening being rectangular and said top and bottom edges of said major opening being narrow and said side edges of said major opening being longer, each of said deformable fingers including a reduced portion connecting said deformable fingers to the respective top or bottom edge which facilitates the bending thereof.

4,955,826

CONNECTOR

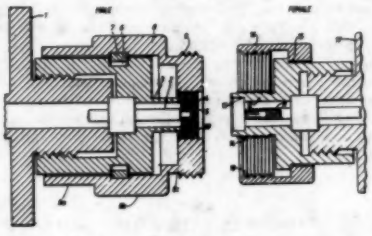
Christopher M. Potter, Stevenage; George Hjipieris, Hitchin, and Paul Bunyan, Letchworth, all of United Kingdom, assignors to Marconi Instruments Limited, Hertfordshire, United Kingdom

Filed Apr. 12, 1989, Ser. No. 337,216

Claims priority, application United Kingdom, May 6, 1988, 8810744

Int. Cl.[5] H01R *13/00*

U.S. Cl. 439—578 **8 Claims**



1. Connection apparatus comprising:

a first connector including a first transmission line of predetermined impedance, a first engagement member retained relative to the first transmission line and having first and second radially separated attachment means; and

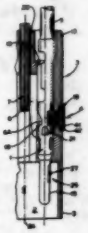
a second connector including a second transmission line of said predetermined impedance, adapted to co-operate in use with the first transmission line for the transmission of signals therebetween, and including first attachment means releasably attachable to said first attachment means on said first engagement member and a second engagement member retained relative to the second transmission line for longitudinal displacement relative to said second transmission lien and including second attachment means releasably attachable to said second attachment means on said first engagement member sequentially with said first attachment means.

4,955,827

DOUBLE-LOCKED SUBMINIATURE TERMINAL PIN WITH OPPOSED LOCKING OPENINGS

Dhirendra C. Roy, Canton, Mich., and George E. Hyde, Fort Wayne, Ind., assignors to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Sep. 14, 1989, Ser. No. 407,486
Int. Cl.[5] H01R *13/40*
U.S. Cl. 439—595 16 Claims



1. A terminal pin for a subminiature electrical connector having a body with at least one internal, elastically deformable finger with an outwardly directed pin locking tab and an opposed, inwardly directed pin locking tab, comprising:

a front, longitudinally extended, electrically conductive, male, pin end portion for being electrically interconnected into a female receptacle for providing electrical continuity between the pin and the female receptacle, said pin end portion including on its outer surface a spring member having two ends and being clamped at both ends, said spring member being formed between two parallel slits made in the surface of said pin end portion, said spring member having a center area and including an outwardly directed dimpled formed in the center area of said spring member,

a longitudinally extended, structurally strong, pin body connected to said pin end portion for attaching the pin to the connector body; said pin body having a rectilinear quadrilateral, lateral cross-section with two sets of opposed, exterior, side surfaces and having on one set of opposed, exterior, side surfaces two, open, female windows into which the outwardly and inwardly directed tabs are inserted for double locking of the pin to the connector body; and

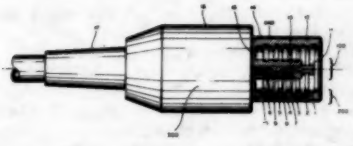
a rear end portion including wire attachment means attached to said pin body at a portion of said pin body removed from its connection with said pin end portion.

4,955,828

MULTIPLE CONTACT COAXIAL SHELL CONNECTOR

Eric Gruenberg, Soquel, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed Nov. 9, 1989, Ser. No. 434,645
Int. Cl.[5] H01R *17/18*
U.S. Cl. 439—668 19 Claims



1. A multiple contact coaxial shell connector comprising:

a post having multiple electrically conductive contact bands insulated from each other and longitudinally spaced along the length of said post;

a first shell coaxially encircling and spaced from said post, said first shell having multiple electrically conductive contact rings insulated from each other and longitudinally spaced along the length of said first shell; with

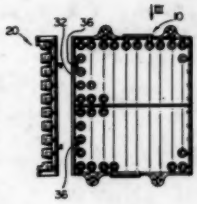
said post and said first shell being fixed in coaxial position and open at a near end for access to said contact bands and rings, and mounted at a far end to a connector body.

4,955,829

FANNING STRIP MEMBER AND TERMINAL BLOCK MEMBER ARRANGEMENT

Robert J. Marks, Carpentersville, and Albert Kupferschmidt, Highland Park, both of Ill., assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 23, 1989, Ser. No. 397,955
Int. Cl.[5] H01R *9/24*
U.S. Cl. 439—719 10 Claims



1. A fanning strip member and terminal block member arrangement comprising a terminal block member having a first side with terminal mounting positions for electrical conductor wires, a second and opposite side for engagement with a terminal block support member, and a third side extending between the first and second sides, and a fanning strip member for location along the third side of the terminal block member, the fanning strip member and said third side having mutually engageable interlocking means for mounting the fanning strip member on said third side with the fanning strip member being detachable from the terminal block member solely by movement of the fanning strip member in the direction of the second side.

4,955,830

CONNECTORS

Noriyoshi Fukumoto, 21-6, Sakuragaoka 2-Chome, Setagaya-ku, Tokyo, Japan

Continuation of Ser. No. 289,801, Dec. 27, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 414,522
Claims priority, application Japan, Dec. 27, 1987, 62-198469; Feb. 10, 1988, 63-16667
Int. Cl.[5] H01R *4/48*
U.S. Cl. 439—821 6 Claims

1. A connector comprising in combination:

(a) an assembly of six side-by-side segments

each segment being made of electrically conductive material,

each segment having a cross sectional portion comprising

(1) an inner half composed of three sides corresponding to one half of a hexagon, and

(2) an outer half,

said inner halves of said six segments forming with their innermost sides a hexagonal-shaped opening that is adapted to accommodate a plug, and

(b) retaining means surrounding and pressing against the outer halves of said six segments, said retaining means including at least one resilient ring that exerts an inward force against said six segments and against any plug that is inserted into said hexagonal-shaped opening.

4,955,831

IGNITION TIMING CONTROL SYSTEM FOR OUTBOARD ENGINE

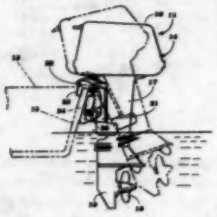
Seiji Inoue, and Seiichi Tanaka, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Mar. 17, 1989, Ser. No. 325,294

Claims priority, application Japan, Mar. 18, 1988, 63-65492

Int. Cl.[5] B63H *21/22*

U.S. Cl. 440—1 **5 Claims**



1. In an engine control for an outboard motor including an engine and adapted to be mounted for trim adjustment of the position of the outboard motor, the improvement comprising means for sensing when a change in trim condition of the outboard motor effects a change in a running characteristic of the engine from normal running and means for adjusting the running characteristic of the engine by adjusting a running system of the engine in response to the sensed condition to maintain normal running of said engine even when the trim condition is changed.

4,955,832

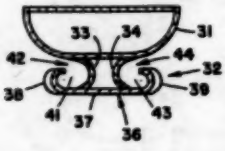
VEHICLE PROPULSION SYSTEM

Ronald V. Hansch, P.O. Box 1964, San Francisco, Calif. 94101-1964

Filed Nov. 7, 1988, Ser. No. 268,216

Int. Cl.[5] B63H *19/02*

U.S. Cl. 440—9 **11 Claims**



1. A propulsion unit comprising

means defining an elongated chamber having a first closed end and a second open end axially of said chamber,

means defining an elongated opening longitudinally of said chamber with the width of such opening decreasing as it progresses inwardly into said chamber, and

said chamber having a curved inner wall in cross section with said opening being tangentially aligned with said curved wall whereby fluid entering said chamber through said opening is redirected into a spiral path within the chamber to flow axially from the second end thereof for producing an axial propulsive force.

4,955,833

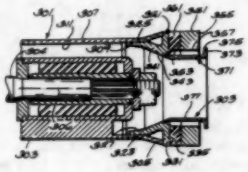
DYNAMIC DAMPER ON MARINE PROPELLER OR PROPELLER SHAFT

Edward K. Lam, Waukegan, Ill., and Heinrich E. Luksch, Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 145,106, Jan. 19, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,325

Int. Cl.[5] F16F *15/12*

U.S. Cl. 440—49 **13 Claims**



2. A propeller comprising an inner sleeve adapted to be mounted on a propeller shaft, an outer hub supporting a propeller blade and having a rearward end, and a resilient member connecting said sleeve to said outer hub, and a damper comprising a carrier secured to said rearward end of said outer hub and including a portion extending rearwardly of said propeller blade, a rigid annulus, and resilient means connecting said carrier portion and said annulus.

4,955,834

RECESSED TROLLING MOTOR MOUNTING

William A. Henderson, Tulsa, and Isaac H. Nelson, Owasso, both of Okla., assignors to Zebco Corporation, Tulsa, Okla.

Filed Aug. 12, 1988, Ser. No. 231,758

Int. Cl.[5] B63H *21/26*

U.S. Cl. 440—63 **5 Claims**

1. In combination:

a boat having a hull defining an inside area to be occupied by a user of the boat;

an outboard motor having a drive propeller; and

means for mounting the outboard motor to the boat for movement relative to the boat between (a) an operative position wherein the propeller is submerged in a body of water on which the boat is buoyed and (b) a storage position wherein the outboard motor resides substantially entirely within the inside area of the hull,

wherein said boat has a floor and a recess beneath said floor and said outboard motor resides entirely within said recess and beneath said floor in said storage position,

wherein said floor has an opening communicating with the

recess and further including a cover and means mounting the cover to the boat so that the cover covers at least a part of the floor opening with the outboard motor in its operative position,

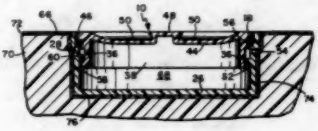
wherein with the outboard motor in its operative position the outboard motor mounting means extends through the floor opening and the cover has a first section to cover the part of the floor opening and a second section movable relative to the first cover section to selectively expose another part of the floor opening with the first cover section covering the part of the floor opening to thereby permit passage through the opening of the outboard motor mounting means with the outboard motor in its operative position.

4,955,835

STORAGE CAPSULE FOR SURFBOARD OR THE LIKE

Dean E. Hollingsworth, 371 Andrew Ave., Encinitas, Calif. 92024

Filed Nov. 14, 1988, Ser. No. 270,097
Int. Cl.[5] B63B *19/00*
U.S. Cl. 441—74 **11 Claims**



1. An apparatus for mounting in surfboard or a means for storing articles therein, comprising:

a cylindrical housing having a closed end and an open end, said housing having at least one integral, mateable retaining rib formed on its inner surface, and an annular shoulder formed on its inner surface adjacent said open end;

a cylindrical lid having a closed end and a cylindrical skirt portion depending from said closed end for close engagement in the upper open end of said housing, a handle member formed at the outer surface of said closed end and at least one integral mating locking rib formed on the outer surface of said skirt portion for mating, locking engagement with said mating retaining rib on the inner surface of said housing;

a gasket member mounted upon the outer surface of said skirt portion adjacent said closed end of said lid for engaging said housing shoulder;

said lid and housing being flush mounted within a board for surfing or sailing.

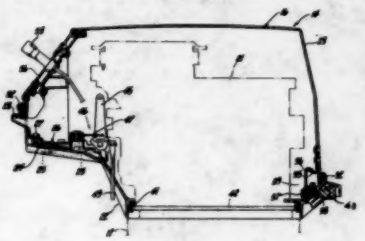
4,955,836

OUTBOARD MOTOR

Tomonori Suzuki, Hamamatsu, and Makoto Toyohara, Hamana, both of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Division of Ser. No. 663,334, Oct. 22, 1984, Pat. No. 4,613,310, which is a continuation of Ser. No. 405,916, Aug. 6, 1982, abandoned. This application Feb. 18, 1986, Ser. No. 830,444
Int. Cl.[5] F02N *17/00*
U.S. Cl. 440—77 **11 Claims**

1. In an outboard motor construction for use when the motor is suspended from an associated watercraft at a level below an operator in the watercraft, said outboard motor having a power head containing an internal combustion engine and a surrounding outer cowling and a drive shaft housing depending from said power head, clamping bracket means positioned beneath said power head for affixing said outboard motor to an outrigger of an associated watercraft so that said power head lies below the upper end ge of the transom of the watercraft, the improvement comprising said outer cowling having an inclined portion formed from a separate piece of cowling and extending upwardly and rearwardly to form a face that may be seen by the operator from above, and an opening herein, a recoil starter for said engine located within said cowling a starter handle accessible from said inclined portion and connected to one end of a starter rope extending through said



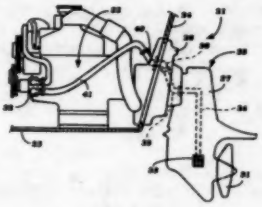
opening, and said starter rope being connected at its other end to said recoil starter, and guide means for said starter rope for defining a path of movement of the starter rope that is perpendicular to the included portion of the cowling and generally in line with the operator and angularly disposed to said drive shaft housing.

4,955,837

COOLING WATER FEED STRUCTURE FOR INBOARD/OUTBOARD ENGINE

Tsuyoshi Yoshimura, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Dec. 27, 1988, Ser. No. 290,444
Claims priority, application Japan, Dec. 28, 1987, 62-329646
Int. Cl.[5] B63H *21/10*
U.S. Cl. 440—88 **4 Claims**



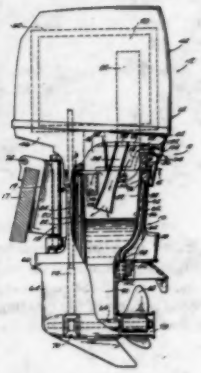
1. In a cooling water system for a marine outboard drive comprised of an outboard drive unit adapted to be mounted on the transom of a watercraft and carrying a propulsion unit adapted to be driven by any one of a plurality of engines positioned within the hull of the associated watercraft, at least two of the engines having water connections at different locations relative to the transom when mounted therein, a water opening formed in said outboard drive unit, and a first conduit formed in said outboard drive unit and extending therethrough between said water opening and an end contiguous to said transom, the improvement comprising a second, rigid conduit communicating at one end with said first conduit transom end and means for mounting said rigid conduit for rotational movement of the other of its ends between at least two different angular positions for communicating with either selected one of the two different engine water connections with the one end thereof communicating with the transom end of said first conduit in either position.

4,955,838

WATER JACKETED EXHAUST RELIEF SYSTEM FOR MARINE PROPULSION DEVICES

Thomas D. Wenstadt, Mobile, Ala., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jul. 12, 1985, Ser. No. 754,534
Int. Cl.[5] B63H *21/32*
U.S. Cl. 440—89 **17 Claims**



5. An outboard motor comprising a propulsion unit including a power head having a lower end and including an internal combustion engine having an exhaust gas passage communicable with said engine, a lower unit having an upper end fixedly connected to said lower end of said power head and including a drive shaft housing and a gear case rotatably supporting a propeller, an engine cover mounted in covering relation to said power head and including an exhaust gas discharge port located above said upper end of said lower unit, and conduit means communicating between said exhaust gas passage and said exhaust gas discharge port, and means adapted for supporting said propulsion unit from a boat transom for vertical swinging movement about a horizontal tilt axis and for horizontal steering movement about a steering axis transverse to said tilt axis.

4,955,839

OAR FOR RACING SHELLS AND METHOD OF MAKING SAME

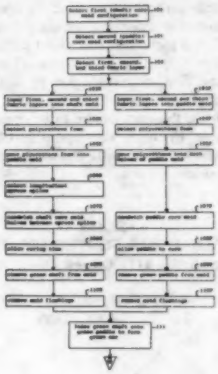
Jürgen R. Kaschper, London, Canada, assignor to Big Creek Sports Ltd.

Filed Jan. 3, 1989, Ser. No. 292,892
Claims priority, application Canada, Jan. 25, 1988, 557414
Int. Cl.[5] B63H *16/04*
U.S. Cl. 440—101 **21 Claims**

1. A unitary oar including a paddle transforming into a shaped shaft that at its opposite end carries a handle portion the oar comprising a shaped paddle having a concave front surface and convex back that at its upper end smoothly merges with the shaft, said shaft having a thickness which increases from adjacent said paddle to the longitudinal center of said shaft, and then decreases in thickness from said longitudinal center to the distal end of said shaft to define the handle portion, said handle portion having a gripping surface thereover, the shaft in section, throughout the handle portion being a cylinder; the oar including;

(a) a smooth outer skin of resin impregnated fiberglass tape and cloth and encircling graphite cloth, and;

(b) an inner core of polyurethane foam that carries in the longitudinal direction and coincident with the longitudinal axis of the paddle a rib member extending essentially



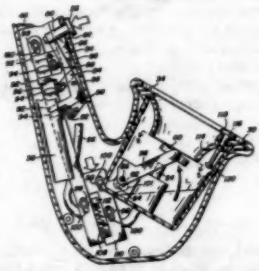
from the paddle throughout the extent of the shaft to the handle.

4,955,840

TOY SOUND-EMITTING AND BUBBLE-BLOWING SAXOPHONE

David E. Moomaw, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Aug. 15, 1989, Ser. No. 394,014
Int. Cl.[5] A63H *33/28, 5/00*
U.S. Cl. 446—17 **5 Claims**



1. A toy sound-emitting and bubble-blowing saxophone comprising:

a mouthpiece;

sound-emitting means;

bubble-blowing means;

air passage means connecting the mouthpiece to the sound-emitting means and bubble-blowing means;

a manually depressible button; and

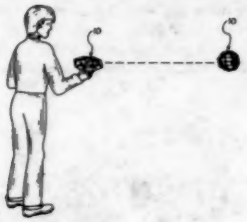
linkage means activated by the button for coupling the manually depressible button to the sound-emitting means and to the bubble-blowing means, whereby depressing the button while blowing into the mouthpiece changes the sound emitted from the sound-emitting means and enables bubbles to be blown from the bubble-blowing means.

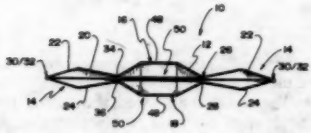
4,955,841

DISC-SHAPED THROWING TOY

Anthony Pastrano, 3131 W. Lambright, Tampa, Fla. 33614

Filed Nov. 3, 1989, Ser. No. 432,384
Int. Cl.[5] A63H 27/00, 33/18
U.S. Cl. 446—46 8 Claims





1. A throwing toy comprising a collapsible shell cooperatively formed by a plurality of segments coupled between a first and second center element and at least one elastic element coupled between at least two of the plurality of segments, each of said plurality of segments includes a first and second segment member operatively coupled together by a first outer hinge said first outer hinge comprises a cylindrical member formed on the end portion of said second segment member and a circular seat formed on the end portion of said first segment member to operatively receive said cylindrical member, wherein corresponding first and second segment members are selectively movable between a first or collapsed position and second or expanded position relative to each other such that as said throwing toy with corresponding first and second segment members in the first or collapsed position relative to each other is thrown the centrifugal force initially maintains the said throwing toy in a substantially flat configuration and as the rotational speed of the said throwing toy decreases said elastic element causes corresponding first and second segment members to move to said second or expanded position relative to each other whereby the said throwing toy forms a ball-like configuration.

4,955,842

FLYING DISK WITH RETRIEVING DEVICE

Ettore Marcotti, 28 Cleveland Pl., Palisades Park, N.J. 07650

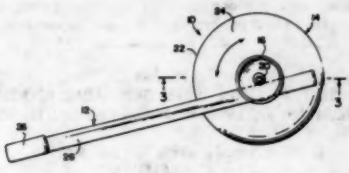
Filed Jan. 10, 1989, Ser. No. 295,446
Int. Cl.[5] A63H 27/00
U.S. Cl. 446—46 8 Claims

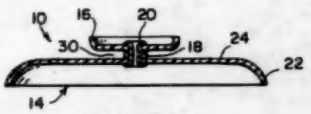
1. A flying disk with handling device, comprising:

(a) a circular flying disk having a saucerlike generally convexly-shaped outer surface;

(b) a saucer-like disk-shaped element having a generally convexly shaped outer surface, substantially smaller in diameter than said flying disk, co-axially fastened to said flying disk so that the generally convexly shaped outer surfaces thereof face each other and are spaced from each other to define a groove therebetween, the respective perimeters of said flying disk and said disk-shaped element being thus arranged to define between them an aperture substantially greater than the dimension of said groove; and

(c) a sword-like handling device for retrieving said flying disk having a handle portion and an elongated flat blade portion, the blade portion of said handling device having a cross-sectional dimension smaller than the groove defined between said disk-shaped element and said flying disk, wherein said disk-shaped element and said flying disk are spaced apart from one another by an axially arranged bushing whose axial length is greater than the cross-sectional dimension of the flat blade portion of said handling device; and





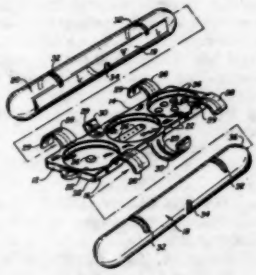
whereby the size of the aperture defined between the perimeters of the flying disk and the disk-shaped element and the central planar portion of the flying disk facilitates the entry of said flat blade portion into the groove between the walls of the flying disk and the disk-shaped element so as to ease the retrieval of said flying disk, the flying disk riding or rolling on the flat blade portion as a wheel would ride or roll on a track.

4,955,843

BOAT TOY AND METHOD FOR MAKING SAME

Henry Bolanos, Mountain Lake; John Piszko, Edison, both of N.J., and David M. Williams, New York, N.Y., assignors to Gruner + Jahr Printing and Publishing Co., New York, N.Y.

Continuation of Ser. No. 583,565, Feb. 27, 1984, abandoned.
This application Nov. 22, 1985, Ser. No. 800,883
Int. Cl.[5] A63H 23/02
U.S. Cl. 446—160 2 Claims



1. A method of assembling a floatable toy comprising a raft portion having longitudinally extending edges and two pontoons comprising floatable, generally cylindrically shaped bodies, each of said pontoons having a longitudinal axis and being defined in part by a cylindrical wall having a depression

therein and each to be affixed to the raft portion adjacent to and parallel with a longitudinal edge comprising:

providing flexible arcuate brackets extending from each of said longitudinal edges, at least a portion of said brackets being adapted to cooperating with and interfit into said depressions in the cylindrical walls of the pontoons;

axially aligning each pontoon along one longitudinal edge and in front of said raft portion in a position of rotation out of its intended position when finally assembled;

sliding said pontoon into axial position parallel to and adjacent the longitudinal edge of the raft and past the brackets; and

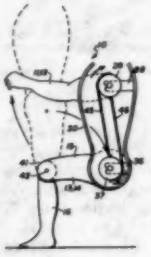
rotating said pontoon to align the depression with the bracket to seat the brackets into said depressions.

4,955,844

SITTING DOLL WITH BENDABLE KNEES

John B. Miller, Jr., 15415 W. Willowwind Cir., Houston, Tex. 77071

Filed Aug. 31, 1989, Ser. No. 400,950
Int. Cl.[5] A63H *33/26*
U.S. Cl. 446—330 **11 Claims**



1. A doll comprising:

a doll torso portion having hip, shoulder, and side regions

a pair of legs pivotally connected to said torso portion in the hip region of said doll and each having an upper leg member and the lower leg member joined thereto at the knee joint and said upper and lower leg members movable relative to one another about the knee joint,

at least one arm member movably mounted to the torso and manually movable between a first position aligned generally vertically with said torso portion and a second raised position aligned generally perpendicular to said torso portion,

said arm member operatively connected to said pair of legs such that manually moving said arm from the first position to the second position causes simultaneous pivotal movement of said pair of legs about the hip region of said doll between a standing position with said legs aligned generally vertically with said torso portion and a sitting position with said legs aligned generally perpendicular to said torso portion.

4,955,845

GAME CALLING DEVICE

Frank R. Piper, Delmont, Pa., assignor to Penn's Woods Products, Inc., Delmont, Pa.

Filed Dec. 24, 1987, Ser. No. 137,951
Int. Cl.[5] A63H *5/00*
U.S. Cl. 446—397 **13 Claims**

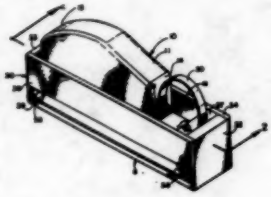
1. A game calling device comprising:

(a) a support having end walls, generally opposing parallel sidewalls and a generally flat bottom wall to provide trough means;

(b) a generally flat friction plate on the bottom wall;

(c) a manually actuatable handle positioned in the trough means for actuating the game calling device to generate a desired game call, the trough means permitting the handle to be controllably and manually moved during actuation toward the friction plate and along a path of movement on the support between the end walls, said trough means guiding longitudinal movement of the handle along said path from a beginning position abutting one end wall toward the other end wall, the sidewalls containing lateral movement of the handle;

(d) a striker having an elongated wand portion protruding from the handle at a selected angle relative to the friction



plate, the wand portion protruding from the handle toward the friction plate on the bottom wall in position to frictionally engage the friction plate along the path of movement upon operative displacement of the handle from the beginning position; and

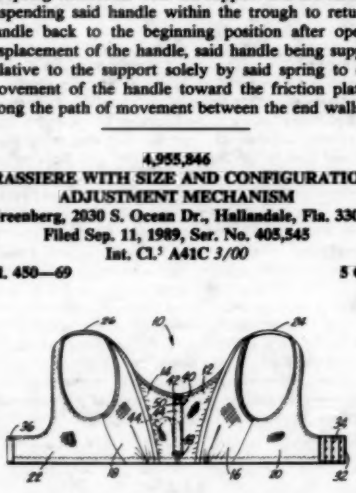
(e) a spring connected with the support and the handle for suspending said handle within the trough to return the handle back to the beginning position after operative displacement of the handle, said handle being supported relative to the support solely by said spring to enable movement of the handle toward the friction plate and along the path of movement between the end walls.

4,955,846

BRASSIERE WITH SIZE AND CONFIGURATION ADJUSTMENT MECHANISM

Bert Greenberg, 2030 S. Ocean Dr., Hallandale, Fla. 33009

Filed Sep. 11, 1989, Ser. No. 405,545
Int. Cl.[5] A41C *3/00*
U.S. Cl. 450—69 **5 Claims**



1. A brassiere having a flexible vertical centerline between two breast cups, and a size and configuration adjustment mechanism comprising:

a separable fastener having first and second linear elements;

said first element being attached to said brassiere along said vertical centerline;

said second element having a fixed end and a free end, the fixed end being attached to an inner surface of said brassiere at a position along said centerline;

said brassiere having an opening along said centerline;

the free end of said second element extending through said opening; and

said second element of said fastener being separably connectable at selected locations along said first element of

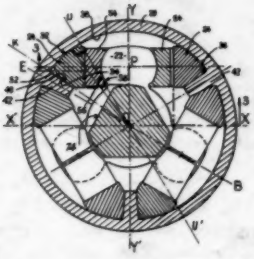
said fastener to affect the vertical height of said centerline of said brassiere.

4,955,847

HOMOKINETIC TRANSMISSION JOINT HAVING A TRIPOD ELEMENT CONNECTED TO A HOUSING ELEMENT BY ROLLING ELEMENTS ON THE TRIPOD ELEMENT AND ROLLING TRACKS IN THE HOUSING ELEMENT

Michel A. Orain, Conflans Ste Honorine, France, assignor to Glaenzer-Spicer, Poissy, France

Filed Oct. 20, 1988, Ser. No. 260,515
Claims priority, application France, Oct. 27, 1987, 87 14856; Mar. 3, 1988, 88 02717; Mar. 3, 1988, 88 02718
Int. Cl.[5] F16D *3/205*
U.S. Cl. 464—111 30 Claims



1. A homokinetic transmission joint, comprising:

a tripod element for connection to a driving shaft, said tripod element having an axis of rotation and three radial arms having radial axes spaced 120° apart;

each said arm having two rolling elements mounted thereon on opposite sides thereof;

a housing element, for connection to a driven shaft, having an axis of rotation and a rolling track for cooperation with each said rolling element;

each said rolling track comprising two rolling track surfaces, a first said rolling track surface comprised of a first spherical surface defined on an inner wall of said housing element and having a center of curvature located on said axis of rotation of said housing element, and a second said rolling track surface comprises of a first conical surface defined by an inner web of said housing element, said inner web extending in a plane containing said axis of rotation of said housing element, and said first conical surface being a portion of a cone, said cone having an apex coincident with said center of curvature of said first spherical surface, said cone having an axis perpendicular to said axis of rotation of said housing element and perpendicular to an axial plane containing the radial axis of said arm cooperating with said rolling track with its respective said rolling elements, and said cone having an apex semi-angle substantially equal to 30°;

each said rolling element having a concave cylindrical surface for cooperation with a respective said arm to enable said rolling element to slide axially relative to said radial axis of said arm, and two adjacent rolling surfaces, said two adjacent rolling surfaces comprising a second spherical surface having a center of curvature located on the cylindrical axis of said concave cylindrical surface of said rolling element and a radius equal to the radius of said first spherical surface of the respective said rolling track, and a second conical surface, said second conical surface being a portion of a cone having an apex coincident with said center of curvature of said second spherical surface, said cone having an axis coincident with said cylindrical axis of said concave cylindrical surface of said rolling element, and said cone having an apex semi-angle substantially equal to 60°; and

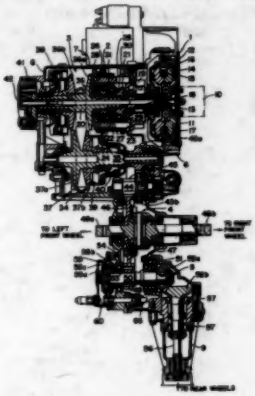
a mans for pivotally mounting each said rolling element relative to its respective said arm.

4,955,848

TRANSFER DEVICE OF FOUR-WHEEL-DRIVE VEHICLE

Takao Kotajima, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 1, 1989, Ser. No. 402,449
Claims priority, application Japan, Sep. 21, 1988, 63-124215[U]
Int. Cl.[5] F16H *11/02*
U.S. Cl. 474—28 7 Claims



1. A transfer device of a part-time type of a four-wheel-drive vehicle driven by an engine in which driving power of the engine is transmitted directly to either of the front and rear wheels and is transmitted selectively to the other wheels by way of a transfer clutch of a transfer device, said device comprising:

a shiftable sleeve forming a member of said clutch;

a rail movable in reciprocating movement to shift said sleeve thereby to engage or disengage said clutch;

a hydraulic actuator for actuating said rail in said reciprocating movement;

hydraulic pressure supply means for supplying hydraulic pressure to said hydraulic actuator;

a changeover valve for controlling the hydraulic pressure to be applied to the hydraulic actuator;

a solenoid for controllably actuating said changeover valve; and

a four-wheel-drive switch for controlling said solenoid by supplying or cutting off energizing current to or from said solenoid.

4,955,849

FRONT DERAILLEUR FOR USE IN BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan

Filed Jun. 28, 1989, Ser. No. 373,319
Claims priority, application Japan, Jun. 30, 1988, 63-87766[U]
Int. Cl.[5] F16H *11/08*
U.S. Cl. 474—80 10 Claims

1. A front derailleur for use in a bicycle, said front derailleur comprising:

a link mechanism (20) including a second line (22) fixedly secured to a bicycle frame (1), third and fourth links (23)

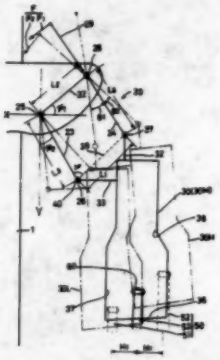
and (24) operatively connected with said second link (22) via pivots (25) and (28) respectively, and a first link (39) operatively connected with said third and fourth links (23) and (24) via pivots (26) and (27) respectively;

a chain guide (30) operatively connected to said first link (39) for moving a chain (60);

urging means (40) for urging said chain guide (30) towards said third link (23);

a control unit (29) operatively connected to said link mechanism 20 for transmitting a control force for pivoting said link mechanism (20);

said link mechanism (20) being pivoted with an input of control force to said control unit (29) to move said chain guide (30) against the urging force of said urging means (40) thereby selectively engaging said chain (60) with a first sprocket (51) positioned at an urging side end of said urging means (40), at least one middle sprocket (53) or



with a second sprocket (52) opposed to said first sprocket (51) across said middle sprocket (53);

wherein said link mechanism (20) operates to incline a posture of said chain guide (30) at its position corresponding to said middle sprocket (53) so as to move a leading end of said guide (30) towards the urging side with respect to a posture of said guide (30) at its position corresponding to said first sprocket (51), said link mechanism (20) alternatively operating to incline a posture of said chain guide (30) at its position corresponding to said second sprocket (52) so as to move the leading end of said guide (30) away from the urging side with respect to the posture of the same at its position corresponding to said middle sprocket (53); and

said third link (23) having an inter-pivot distance L3 which is longer than an inter-pivot distance L4 of said fourth link (24).

4,955,850

SPROCKET CHAIN CLEANING DERAILLEUR WHEEL

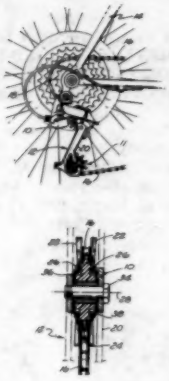
Glen Lee, 7777 W. 91st St. Unit E3146, Playa del Rey, Calif. 90293

Filed Oct. 10, 1989, Ser. No. 418,848
Int. Cl.[5] F16H *57/00*
U.S. Cl. 474—92 **14 Claims**

1. A derailleur wheel for use with a vehicle utilizing a sprocket chain derailing system, comprising:

(a) a derailleur wheel having a centrally disposed circular sprocket and first and second circular side faces located on each side of said circular sprocket, and

(b) a plurality of cleaning brushes secured to said side faces, said cleaning brushes being radially spaced apart and extending in a radially outward direction, thereby resulting in the cleaning of the said sprocket chain by the brush-



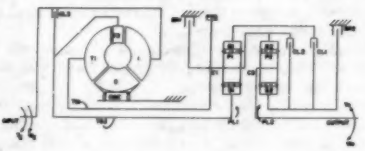
ing of said brushes against the sprocket chain during use of the vehicle.

4,955,851

TRANSMISSION AND METHOD OF OPERATION

John Arzoian, Dearborn; Shan Shih, Troy, and Edward G. Trachman, Birmingham, all of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 23, 1988, Ser. No. 235,140
Int. Cl.[5] F16H *47/08*
U.S. Cl. 475—59 **16 Claims**



1. A planetary transmission apparatus comprising:

a transmission housing;

an input shaft;

an output shaft;

a first planetary gear set in said housing including a first sun gear, a first planet gear carrier, first planet gears mounted for rotation on said first planet gear carrier and in meshing engagement with said first sun gear, and a first ring gear in meshing engagement with said first planet gears, said first planetary gear set being arranged to be driven by said input shaft;

a second planetary gear set in said housing operatively connected with said first planetary gear set and including a second sun gear, a second planet gear carrier, second planet gears mounted for rotation on said second planet gear carrier and in meshing engagement with said second sun gear, and a second ring gear in meshing engagement with said second planet gears, said second planetary gear set being arranged to drive said output shaft;

a torque converter having an impeller operatively coupled to said input shaft and including a primary turbine operatively coupled to said first planet gear carrier, a secondary turbine operatively coupled to said first sun gear, and a stator operatively coupled by a one-way clutch to said transmission housing;

first brake means operatively coupled to said transmission

housing and said primary turbine for selectively braking said primary turbine to said transmission housing;

said first planet gear carrier being operatively coupled to said first brake means for selectively braking said first planet gear carrier with said primary turbine relative to said transmission housing;

a second ring gear being operatively coupled to said first brake means for selectively braking said second ring gear, said first carrier and said primary turbine to said transmission housing;

a first, friction clutch operatively coupled to said first ring gear and said second sun gear for selectively coupling said first ring gear to said second sun gear; and

means for directly coupling said input shaft to said first planetary gear set.

4,955,852

PLANETARY GEAR MECHANISM HAVING MEANS FOR ACCURATE ALIGNMENT OF SUN GEAR

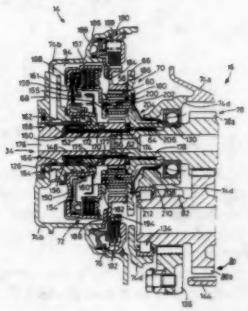
Kunio Morisawa, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 30, 1989, Ser. No. 374,144

Claims priority, application Japan, Jul. 7, 1988, 63-169462; Apr. 21, 1989, 1-103046

Int. Cl.[5] F16H *3/44*

U.S. Cl. 475—146 **8 Claims**



1. A planetary gear mechanism comprising:

a rotating shaft having a splined end portion;

a sun gear splined at a free end of said splined end portion, for rotation with said rotating shaft;

planetary gears engaging said sun gear;

a carrier for rotatably supporting said planetary gears;

a ring gear engaging said planetary gears;

a clutch for connecting said rotating shaft and said carrier, said clutch including a first rotary member splined on said splined end portion of the rotating shaft, for rotation with said rotating shaft such that said first rotary member is adjacent to said sun gear at said free end, first friction means supported by and rotatable with said first rotary member, a second rotary member rotatable with said carrier, and second friction means supported by and rotatable with said second rotary member, said first and second friction means frictionally engaging each other to transmit power therebetween;

a housing in which said rotating shaft, said sun gear, said planetary gears, said carrier, said ring gear and said clutch are accommodated, said housing rotatably supporting said first rotary member in a substantially radially fixed position for maintaining radial alignment of said first rotary member with a nominal axis of rotation of said rotating shaft; and

said first rotary member supporting said sun gear, and said first rotary member and said sun gear including means for maintaining coaxial relation with each other, whereby said sun gear is maintained in said substantially radially fixed position.

4,955,853

DIFFERENTIAL GEAR UNIT FOR MOTOR VEHICLE DRIVE AXLES

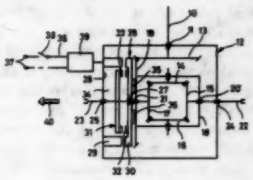
Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 9, 1989, Ser. No. 321,135

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808402

Int. Cl.[5] F16H *1/44*; F16D *27/118, 23/10*

U.S. Cl. 475—241 **7 Claims**



4. A differential gear unit for drive axles of motor vehicles, which has a differential housing and a differential lock comprising a jaw clutch which can be completely locked up and which includes a jaw clutch plate which is non-rotatably connected to a differential case for differential gears, but is axially displaceable relative thereto, a cooperating jaw clutch counterplate which is mounted non-rotatably and axially non-displaceably on a differential gear drive axle, wherein the jaw clutch plate also serves as an armature for an electromagnet constructed as a ring magnet which is energized to engage the jaw clutch plate with the jaw clutch counterplate, and wherein the jaw clutch plate can be released from the jaw clutch counterplate by spring means which are biased when the jaw clutch is engaged, characterized in that the ring magnet is fixed to the differential housing, and the jaw clutch counterplate is disposed within a space formed by the ring magnet.

4,955,854

APPARATUS FOR SUBDIVIDING STACKS OF SHEETS OF PAPER AND THE LIKE

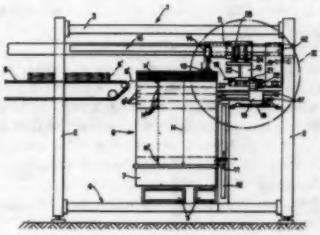
Oscar Roth, Reblandstrasse 17, CH-5622 Waltenschwil Schweiz, Switzerland

Filed Jul. 28, 1989, Ser. No. 387,163

Claims priority, application Switzerland, Aug. 1, 1988, 2905/88; Dec. 13, 1988, 4603/88

Int. Cl.[5] B65H *35/10, 33/02*

U.S. Cl. 225—103 **35 Claims**



1. Apparatus for subdividing stacks of overlapping discrete sheets of paper and the like into piles, comprising a stack-supporting elevator movable up and down along a substantially

vertical path; and a conveyor adjacent one side of said path and having a substantially horizontal surface disposed at a predetermined level and arranged to receive piles from the stack on said elevator, said elevator being movable to positions in which a portion at least of the stack of sheets thereon extends above said level; and means for transferring piles of sheets from the top of the stack on said elevator onto said surface, including a pusher above said level, a substantially horizontal and substantially flat separating element disposed beneath said pusher at or above said level and extending beyond said pusher toward said conveyors and means for reciprocating said pusher and said element along a substantially horizontal path between a retracted position in which said pusher and said element are located at a first distance from said conveyor at the other side of said vertical path, and a second position in which said pusher and said element are located at a shorter second distance from said conveyor whereby said element penetrates into the stack on said elevator to separate a pile of sheets located above said element from sheets therebelow and the pusher thereupon transfers the thus formed pile element from said vertical path onto said surface during movement of said pusher and said element from said first to said second position.

4,955,855

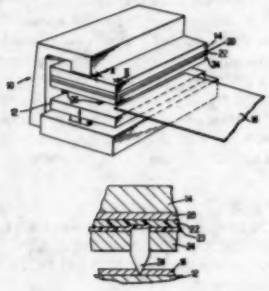
DIE CUTTING APPARATUS WITH IMPRESSIBLE COATING

Walter Saebeler, 30380 N. Darrell Rd., McHenry, Ill. 60050, and Michael Resnick, 9830 Huber La., Niles, Ill. 60648

Filed Nov. 15, 1988, Ser. No. 271,629

Int. Cl.[5] B31B *1/20*

U.S. Cl. 493—404 **11 Claims**



1. A method of die cutting a sheet into a blank using a machine having movable and stationary platens associated therewith, and a tool-carrying die assembly associated with one of said platens comprising the steps of:

casting a liquid onto a plate;

solidifying said liquid into a coating having the characteristics of being impressible so as to form an impression and hardenable so as to harden said coating and retain an impression;

positioning said coated plate in said machine between the tool-carrying die assembly and the associated platen;

impressing said coating with the back edge of a tool so as to adjust for any irregularities between the tool and platen and so as to assure uniform cutting of the sheet to a blank, by moving one of said platens toward the other so that the working end of the tool engages the other platen and the irregularities between the support end of the tool and the platen are adjusted for by the coating;

removing the coated plate from the machine;

hardening the coating;

returning the hardened coating to said machine in substantially the initial position so as to permit the tools to fit within the original impression;

positioning an elastomeric sheet between the hardened coating and die assembly; and thereafter

die cutting sheet stock into blanks.

4,955,856

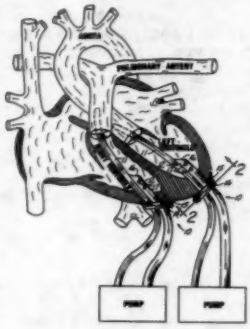
METHOD AND APPARATUS FOR INSTALLING A VENTRICULAR ASSIST DEVICE CANNULAE

Steven J. Phillips, 5300 Woodland, Des Moines, Iowa 50312

Filed Jun. 30, 1989, Ser. No. 374,652

Int. Cl.[5] A61M *1/03*

U.S. Cl. 600—16 **3 Claims**



1. A method of installing a ventricular assist device cannulae of a type including a blood drainage cannula tube having a first end and a second end and a blood inlet cannula tube having a first end and a second end, said method comprising:

making a single opening in a heart;

inserting the blood drainage cannula tube through said single opening whereby said first end thereof is disposed in a heart chamber;

inserting the blood inlet cannula tube through said opening and through the aortic valve so that said first end thereof is disposed in said aorta;

suturing said blood drainage cannula tube and said blood inlet cannula tube to said opening for sealing said opening and holding said cannula tubes in place;

attaching said second end of said blood drainage cannula tube to the inlet port of a pump; and,

attaching said second end of said blood inlet cannula tube to the outlet port of said pump whereby this design of cannula only a single opening into the heart is needed instead of two.

4,955,857

MULTI-ENZYME BIOREACTOR THERAPY FOR CANCER

Udipi R. Shettigar, 1021 Medical Plz. South, Salt Lake City, Utah 84112

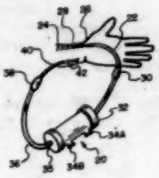
Continuation-in-part of Ser. No. 220,544, Jul. 18, 1988. This application Aug. 10, 1988, Ser. No. 231,133

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—5 **5 Claims**

1. A method of simultaneously depleting essential amino acids, nonessential amino acids, and folate from a fluid comprising:

shunting said fluid through means for altering the chemical structure of the essential amino acids, nonessential amino



acids, and folates thus depleting said essential amino acids, nonessential amino acids, and folates from said fluid.

4,955,858

URETER DRAIN CATHETER RELEASABLY CLAMPED TO AN ADVANCING TUBE

Kurt Drews, Oststeinbek, Fed. Rep. of Germany, assignor to Uromed Kurt Drews GmbH, Oststeinbek, Fed. Rep. of Germany

Filed Sep. 12, 1989, Ser. No. 406,231
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837196
Int. Cl.[5] A61M *25/01*
U.S. Cl. 604—8 **3 Claims**

1. A ureter drain catheter and positioning assembly comprising

a flexible ureter drain catheter having an open proximal end and inner and outer substantially cylindrical surfaces;

an advancing tube having an open distal end terminating in a cross sectionally reduced neck with an outer diameter smaller than the inner diameter of said drain catheter so that said distal end is insertable into the proximal end of said ureter drain catheter, and

a mandrin insertable through said advancing tube and into said neck, said mandrin having an outer diameter greater than the inner diameter of said neck such that neck is clamped between said mandrin and said inner surface of said drain catheter and said mandrin is substantially centrally positioned in said catheter without making contact with said inner surface of said catheter.

4,955,859

HIGH-FRICTION PROSTATIC STENT

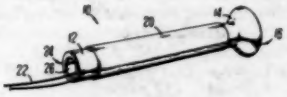
Serge Zilber, Conyers, Ga., assignor to C. R. Bard, Inc., Murray Hill, N.J.

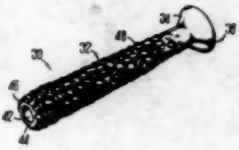
Filed Jul. 7, 1989, Ser. No. 376,822
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—8 **6 Claims**

1. An apparatus for the nonsurgical management of bladder outlet obstruction, comprising:

an elongated body having an exterior surface, said body having first and second ends and defining a passage therethrough, said body being dimensioned to be received within a prostatic urethra and having a length sufficient to extend only from a bladder neck approximately to a verumontanum, and said body comprising an inner member of silicone rubber having a durometer hardness of about 80 on the Shore A scale and a concentric outer member of silicone rubber having a durometer hardness of about 40 on the Shore A scale, said outer member being bonded to said inner member, and said concentric outer member having an exterior surface comprising said exterior surface of said body;

said body being sufficiently flexible to accommodate an anatomical bend of said prostatic urethra and sufficiently stiff to maintain patency of said passage in response to accommodation of said anatomical bend of said prostatic urethra and in response to constrictive forces exerted by an enlarged prostate surrounding said prostatic urethra; and





high friction means on said exterior surface of said body for frictionally engaging the walls of said prostatic urethra to prevent said apparatus from migrating proximally;

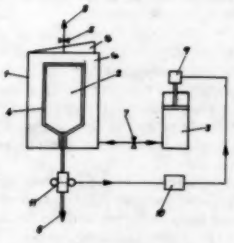
whereby when said apparatus is positioned within said prostatic urethra with said first end disposed at said bladder neck and said body extending approximately to said verumontanum, said body provides support to said prostatic urethra to ensure patency thereof.

4,955,860

VOLUMETRIC PUMP FOR PARENTERAL PERFUSION

Miguel M. Ruano, c/o Dr. Moliner No. 2-10, Valencia, Spain 46010

Filed Apr. 11, 1988, Ser. No. 180,067
Claims priority, application Spain, Apr. 9, 1987, 8701025
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—67 **3 Claims**



1. Apparatus for parenteral perfusion of a liquid to a patient from a perfusion bag having an outlet tube, said apparatus comprising a rigid housing defining an interior chamber for receiving a perfusion bag in a gas-tight manner, a perfusion bag within said chamber so that said chamber defines an enclosed space surrounding said bag, said bag having an outlet tube extending from said chamber, suction means for evacuating

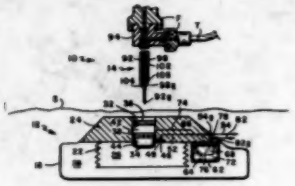
said space, a volumetric fluid pump, connection means between said pump and said housing for filling said space with pressurized fluid received from said pump for applying pressure on said bag to produce perfusion of liquid in said bag through said tube, means for controlling the rate of fluid flow from said pump into said space to control the perfusion rate, and sensor means for sensing the amount of liquid administered to the patient through the outlet tube and operatively connected to said means for controlling the rate of fluid flow from said pump into said space.

4,955,861

DUAL ACCESS INFUSION AND MONITORING SYSTEM

Bradley J. Enegren, Norfolk; Gerald S. Melsky, Lexington, and Frank R. Prosl, Duxbury, all of Mass., assignors to Therex Corp., Walpole, Mass.

Filed Apr. 21, 1988, Ser. No. 184,352
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—141 **11 Claims**



1. A dual access infusion or monitoring system comprising in combination

A. implantable apparatus having

1. a biocompatible hermetically sealed housing,
2. an inlet passage extending into said housing from an exterior surface thereof, said passage having an outer end adjacent to said housing surface and an inner end located inside the housing,
3. needle stop means at the inner end of said passage;
4. a plurality of needle-penetrable, self-sealing septa mounted in said passage at selected different spacings from said needle stop thereby to divide said passage into a plurality of aligned segments; and
5. means defining separate fluid outlets from said passage segments,
6. an infusate pump inside the housing in fluid communication with one of said housing passage segment fluid outlets,
7. a catheter extending out of said housing, said catheter having at least one lumen for conducting fluid from said pump to an infusion site, and
8. a first fluid outlet in the housing for conducting fluid from said pump to said catheter, and

B. fluid injection means including

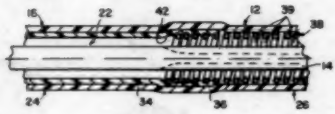
1. a plurality of tubes having proximal and distal ends and separate axial lumens therebetween, the number of tubes in the injection means corresponding to the number of passage segments in the implantable apparatus housing,
2. hub means mounted to the proximal ends of said tubes,
3. means defining separate fluid passages in said hub means extending from different surface locations on the hub means to the lumens of different ones of said tubes, and
4. means in said tubes defining outlets from said tube lumens, the axial spacings of said outlets along said injection means corresponding substantially to the spacings of said housing passage segments in said implantable apparatus so that when the injection means are inserted through said septa into said housing passage until the injection means bottom on said needle stop means, said tube outlets are positioned in different ones of said passage segments so that they are isolated from one another and from the atmosphere by at least one septum whereby separate fluid-tight fluid paths exist between said hub means surface locations and said housing passage segment outlets.

4,955,862

CATHETER AND CATHETER/GUIDE WIRE DEVICE

Ivan Sepetka, Mountain View, Calif., assignor to Target Therapeutics, Inc., San Jose, Calif.

Filed May 22, 1989, Ser. No. 355,500
Int. Cl.[5] A61M *25/01*
U.S. Cl. 604—164 **17 Claims**



1. A catheter for use in combination with a guide wire for accessing a target si-e in an internal body tissue along a tortuous, small-vessel pathway within the tissue, said catheter comprising

an elongate tubular member having proximal and distal ends, and an inner lumen extending between these ends, with a diameter which is no greater than about 40 mils, said member including relatively flexible distal segment means at least about 5 cm long adapted for tracking the wire along such tortuous path, said distal segment means being composed of:

(i) a flexible outer polymer tube, and

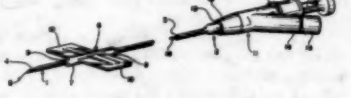
(ii) flexible surface means embedded in the inner surface of the outer polymer tube providing a surface made up of disjoint, relatively non-deformable surface regions arranged to provide uninterrupted contact with a guide wire, as the distal segment of the catheter is advance over a looped or bent region of a guide wire, allowing the distal segment to be advanced, by remote axial force, over a looped smooth-surfaced guide wire whose loop diameter is substantially smaller than that of the smallest loop over which a flexible polymer tubing having a smooth inner wall surface can be advanced by remove axial force.

4,955,863

ADJUSTABLE CATHETER ASSEMBLY

Jack M. Walker, Portola Valley, and Neil J. Sheehan, Palo Alto, both of Calif., assignors to Menlo Care, Inc., Palo Alto, Calif.

Continuation of Ser. No. 120,062, Nov. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 826,439, Feb. 5, 1986, Pat. No. 4,728,322. This application Jun. 12, 1989, Ser. No. 366,268
The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—165 **36 Claims**



1. A catheter assembly, comprising:

a cannula having a distal end portion, a proximal end portion, and a longitudinal duct therethrough from the distal end portion to the proximal end portion;

a needle having a distal and a proximal end and having a

sharpened insertion tip at the distal end, the needle being positioned within the distal end portion of the longitudinal duct of the cannula with the insertion tip extending beyond the distal end of the cannula;

a catheter inserter having inserter distal and proximal ends and having a cannula guide channel extending from the inserter distal end to the inserter proximal end, the cannula being positioned in slidable relationship through the channel such that the distal end portion of the cannula extends beyond the distal end of the channel; and

a means for selectively restricting the cannula and needle from sliding relative to the channel;

material which when inserted into a body of a living subject and maintained therein:

(a)

(i) softens with a softening ratio of at least about 2:1; and/or

(ii) swells with a swelling ratio of at least about 1.3:1;

(b) has a tensile energy to break of at least about 700 N-cm/cm^3; and

(c) has a 2.5% Secant modulus of less than about 7,000 N/cm^2.

4,955,864

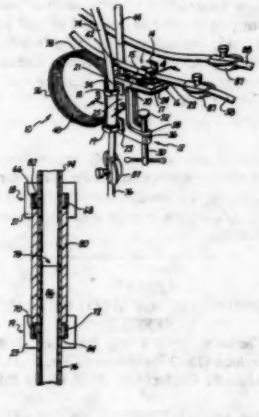
TUBE HOLDING CLAMP

James D. Hajduch, 1703 Caroline Ave., Whiting, Ind. 46394

Continuation-in-part of Ser. No. 637,019, Aug. 2, 1984, abandoned. This application Oct. 4, 1989, Ser. No. 416,876

Int. Cl.^{5} A61M *39/00*

U.S. Cl. 604—174 **20 Claims**



1. An apparatus useful for holding a segment of hollow tubing comprising: clamp housing means; and clip means secured to said clamp housing means, said clip means being sized and adapted to be opened to accept a segment of hollow tubing and to be closed around the segment of hollow tubing without substantially changing the cross-sectional shape of the segment of hollow tubing and substantially without frictionally contacting the segment of hollow tubing.

4,955,865

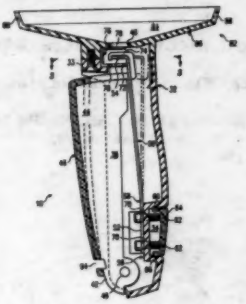
NEEDLE UNSHEATHING, RESHEATHING AND HANDLING APPARATUS

Eric L. Steiner, Denver, and Arthur J. Sable, Boulder, both of Colo., assignors to On-Gard Systems, Inc., Denver, Colo.

Filed Jan. 18, 1989, Ser. No. 298,619

Int. Cl.^{5} A61M *5/32*

U.S. Cl. 604—192 **18 Claims**



1. An apparatus for selectively retaining a needle sheath comprising:

a housing;

a gripping portion at least partially defined by said housing and adapted to be gripped by the hand of a user; and

retaining means positioned at least partially within said housing and comprising an external portion that partially defines said griping portion and that is of a longitudinal length sufficient to allow at least the majority of a user's hand to apply pressure thereto for selectively engaging and disengaging a sheath when said gripping portion is gripped transversely by the user.

4,955,866

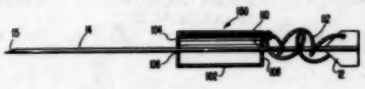
HYPODERMIC NEEDLE RECAPPING DEVICE

George A. Corey, Duluth, Minn., assignor to University of Florida, Gainesville, Fla.

Continuation-in-part of Ser. No. 259,894, Oct. 19, 1988, abandoned. This application May 16, 1989, Ser. No. 352,198

Int. Cl.^{5} A61M *5/32*

U.S. Cl. 604—192 **29 Claims**



1. A recapping device for use with a medical device including a needle or needle-like device having a proximal end secured to said medical device and a distal end terminating in a needle tip, said recapping device comprising shield means for shielding said distal needle end tip, said shield means comprising:

a. a hollow sleeve adapted to encircle a portion of said needle, a distal end opening of said hollow sleeve having means for enclosing said opening in said hollow sleeve at said distal end, said enclosing means having an aperture therein adapted to permit the distal needle end tip to slide therethrough, said sleeve being freely slidably movable along said needle between a first position on said needle, said first position being characterized by said distal end tip of said needle projecting through said aperture at said distal end of said sleeve for a distance sufficient to enable use of said medical device and a second position on said needle being characterized by said distal needle end tip

being enclosed within said sleeve and said enclosure means at said distal end of said hollow sleeve; and

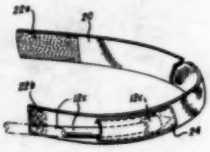
b. tether means for securing said sleeve to said medical device and for permitting substantially free slidable movement of said hollow sleeve along said needle from said first position to said second position, without said tether means exerting a biasing force on said sleeve toward either said first position or toward said second position.

4,955,867

PERITONEAL DIALYSIS CATHETER PROTECTOR BELT

Walter Y. Endo, 3515 S. Wellington Rd., Los Angeles, Calif. 90016

Filed May 12, 1989, Ser. No. 350,774
Int. Cl.[5] A61M 5/32
U.S. Cl. 604—179 **6 Claims**



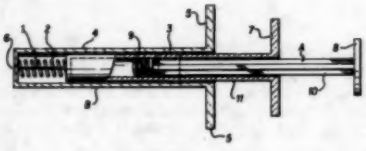
1. A article for retaining and protecting the protruding end of a peritoneal dialysis catheter comprising: a flexible belt adapted to extend around the waist of a patient having the end of a peritoneal dialysis catheter protruding from the abdomen, the belt being adapted to be positioned on the abdomen adjacent to the protruding end of the catheter, said belt having an inner side and an outer side; and a pouch affixed to the outer side of the belt and extending longitudinally along the belt, said pouch having an open end for receiving the protruding end of the catheter, and said pouch having a closed end, said pouch serving to retain the end of the catheter within the pouch.

4,955,868

DISPOSABLE SAFETY MEDICAL SYRINGE

Edward Klein, 2 Professional Dr. Ste. 232, Gaithersburg, Md. 20879

Continuation of Ser. No. 279,254, Nov. 28, 1988, abandoned, which is a continuation of Ser. No. 122,679, Nov. 19, 1987, abandoned. This application Oct. 4, 1989, Ser. No. 418,819
Int. Cl.[5] A61M 5/32
U.S. Cl. 604—198 **1 Claim**



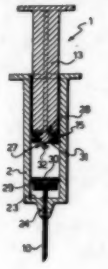
1. A shield for use with a conventional unitary hypodermic syringe having a tubular body, piston and needle comprising a unitary cylindrical jacket of fixed length for enclosing and holding said hypodermic syringe partially within said jacket, said jacket having a constricted opening at one end for passage of the hypodermic needle of said syringe in response to displacement of the syringe within said jacket and being open at its other end to permit emplacement of said syringe so that the syringe piston and the portion of the syringe body proximate thereto extend beyond said jacekt and such that movement of said syringe piston in either direction within the tubular body of the syringe is independent of either said jacket or movement of the syringe body within said jacket, resilient spring means disposed within said jacket proximate to said constricted opening and around said syringe needle for maintaining said syringe in a retracted position within said jacket but permitting said unrestricted longitudinal displacement of the syringe in either direction within the jacket to cause passage of the needle through said constricted opening in the unitary jacket.

4,955,869

DISPOSABLE SAFETY SYRINGE WITH A HYPODERMIC NEEDLE

Valter Bin, Bruino, Italy, assignor to Vabin International S.r.L., Cuneo, Italy

Filed Feb. 3, 1989, Ser. No. 305,925
Claims priority, application Italy, Feb. 4, 1988, 67077 A/88
Int. Cl.[5] A61M 5/32
U.S. Cl. 604—195 **7 Claims**



1. A disposable safety syringe, comprising:

a syringe body;

a plunger engageable with said body for sliding movement within said body;

a hypodermic needle having an extended position outside said body and a retracted position within said body;

an engagement peg formed at one end of said plunger;

a supporting pad, for supporting said needle, arranged within said body for axial movement within said body, said pad having an engagement seat formed therein for engagement with said peg; and

an elastically yielding seal mounted to said one end of said plunger;

wherein said elastically yielding seal applies an elastic pressure to said needle when said needle is retracted into said body for biasing the needle out of alignment with the longitudinal axis of the needle when the needle is in an extended position.

4,955,870

HYPODERMIC SYRINGE WITH RETRACTABLE NEEDLE

Kristen A. Ridderheim, 8508 Gerig Rd., Leo, Ind. 46765; V. Widadi Sudharto, 6825-G Ramblewood Dr., Fort Wayne, Ind. 46835, and Alice F. Ridderheim, 8508 Gerig Rd., Leo, Ind. 46765

Filed Aug. 23, 1988, Ser. No. 235,437
Int. Cl.[5] A61M 5/00
U.S. Cl. 604—195 **33 Claims**

1. A hypodermic syringe comprising:

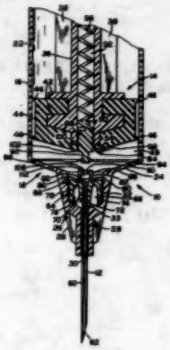
a barrel having a closed end, an open end, and an interior surface;

a plunger reciprocally received in said barrel through said open end in sealing engagement with said interior surface of said barrel and forming a chamber;

a hollow needle detachably attached to said barrel at said

closed end thereof providing communication between said chamber and the exterior of said barrel and wherethrough liquid in said chamber may be injected;

means for forming a hole in said plunger for receiving said needle therethrough;



biasing means connected to said plunger and attachable to said needle for drawing said needle through said plunger hole when said needle is detached from said barrel; and,

wherein said needle is detached from said barrel by a predetermined substantially longitudinal force.

4,955,871

SINGLE-USE DISPOSABLE SYRINGE

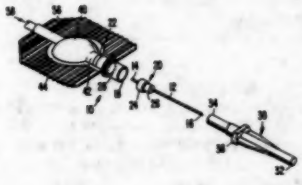
Ronny D. Thomas, Bellevue, Wash., assignor to PATH, Seattle, Wash.

Continuation-in-part of Ser. No. 44,054, Apr. 29, 1987, abandoned, and a continuation-in-part of Ser. No. 199,612, May 27, 1988, Pat. No. 4,883,473. This application Jun. 1, 1989, Ser. No. 360,125

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] A61M *5/18, 5/32*

U.S. Cl. 604—217 **24 Claims**



1. A single-use disposable syringe for providing a medicament for injection into a patient, the syringe comprising:

needle assembly means for injecting the medicament into the patient; and

reservoir means for storing the medicament and for expelling the medicament into the needle assembly means, the reservoir means including two sheets of thermoplastic material, wherein each of the two thermoplastic sheets is comprised of an expanded central portion, an expanded injection neck portion, an expanded filling neck portion, and a substantially flat peripheral portion,

in which the substantially flat peripheral portions of the two sheets of thermoplastic material are opposite and coextensive to each other and are sealed together face-to-face, and the expanded central portions are opposite and coextensive to each other, to form a reservoir for storing the medicament,

in which the expanded injection neck portions extend from the expanded central portions to a first end of each sheet, and are opposite and coextensive to each other, to form an injection port extending from the reservoir and connected to the needle assembly means for directing the medicament from the reservoir to the needle assembly means, and

in which the expanded filling neck portions extend from the expanded central portions to a second end of each sheet, and are opposite and coextensive to each other, to form a filling port extending from the reservoir for filling the reservoir with the medicament;

wherein the expanded central portions are compressible, and in response to complete compression of both of the central portions together, the reservoir substantially collapses to prevent the reservoir from being reformed and to expel the medicament out of the reservoir;

wherein in response to partial compression of both of the central portions together, the reservoir partially collapses to expel some of the medicament out of the reservoir; and

wherein the central portions, after partial compression of both of the central portions together and partial collapse of the reservoir, expand to reform the reservoir and to draw fluid into the reservoir, thereby aspirating the needle assembly means.

4,955,872

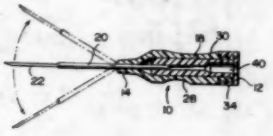
INTRAVENOUS NEEDLE AND HOLDER ASSEMBLY

James Callaway, 300 25th Ave. North, Nashville, Tenn. 37203

Continuation-in-part of Ser. No. 62,584, Jun. 16, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 314,789

Int. Cl.[5] B61M *5/158*

U.S. Cl. 604—273 **20 Claims**



1. An intravenous needle and holder assembly having an outer case, an intravenous needle for receipt in the outer case with at least a part of the needle projecting from a forward end of the case, and adjustment means attached to a back end of the needle for selectively establishing an insertion orientation of the assembly having a substantially rigidified junction between the needle and the case effectively preventing lateral movement of the case, relative to the needle, and an administration orientation of the assembly having a flexible junction between the needle and the case allowing lateral movement of the case relative to the needle.

4,955,873

STABILIZING SUPPORT STAND

Jack Rajlevsky, Rego Park, N.Y., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

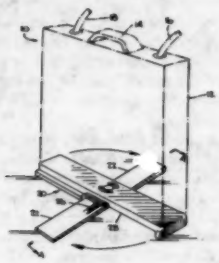
Filed May 6, 1988, Ser. No. 190,795

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—322 **14 Claims**

1. A stand particularly suitable for use in stabilizing a drainage receptacle designed and configured to receive and collect fluids from a patient comprising a pedestal with means for nondetachable coupling to a box of said receptacle and adapted

for deployment in a position for stabilizing said receptacle against upset, and means of unitary structure formed in a sur-

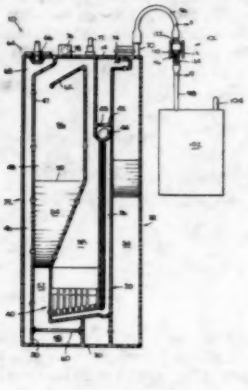


face of said pedestal for positively mechanically locking said pedestal at said receptacle stabilizing position.

4,955,874
DRAINAGE DEVICE

Quinton J. Farrar; Frederick A. Everett, Jr., both of Lakeville, Mass., and Richard H. Heimann, Flushing, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Sep. 27, 1988, Ser. No. 249,808
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—319 **40 Claims**



1. A drainage device comprising
a housing;
at least one inlet in said housing adapted to be connected to a patient for draining fluids from said patient;
at least one outlet in said housing adapted to be connected to a source of suction;
at least one collection chamber formed within said housing for receiving said fluids; and
a suction control chamber formed within said housing and having a vertical longitudinal axis and adapted to receive a predetermined volume of liquid for regulating the degree of vacuum imposed in said collection chamber, means for connecting said suction control chamber with ambient, said suction control chamber being in fluid flow communication with said collection chamber and including
a minor arm portion;
a major arm portion; and
a passageway proximate a first end of said major arm portion connecting said arm portions and providing fluid flow communication there between, with at least a segment of said major arm portion, having more than one upwardly diverging wall with respect to said axis and being downstream of said small arm, being designed and configured generally of funnel shape in full transverse sections along said axis.

4,955,875
CATAMENIAL APPLIANCE

Charlene G. Knowles, 1216 Pear Orchard Rd., Elizabethtown, Ky. 42701

Continuation-in-part of Ser. No. 96,514, Sep. 11, 1987, Pat. No. 4,799,929, which is a continuation-in-part of Ser. No. 948,104, Dec. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 723,466, Apr. 15, 1985, abandoned. This application Jan. 23, 1989, Ser. No. 300,817
Int. Cl.[5] A61F *5/44*
U.S. Cl. 604—331 **4 Claims**

1. A Catamenial appliance comprising:
flexible ring means insertable into the vagina of a female and adaptable to surround the cervix of said female, said flexible ring means being biased to expand slightly outwardly after insertion over said cervix and having a relatively small cross-sectional area whereby contact with the vaginal walls of said female is limited to a generally narrow band of contact defined by the outer periphery of said small cross-sectional area of said flexible ring means, collecting sheath means attached to said flexible ring means and extending downwardly therefrom to contain and direct menstrual fluids downwardly from said cervix through said vagina of said female, said sheath means at its distal end including a radially extending small self-collector adapted to lie substantially within the vulvar space of said female.

4,955,876
BILI BOTTOM DIAPERS

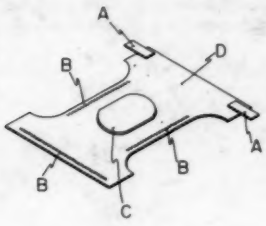
Patricia M. Milliner, Brainerd, Minn., assignor to The Pennsylvania Research Corporation, University Park, Pa.

Filed Feb. 29, 1988, Ser. No. 138,879
Int. Cl.[5] A61F *13/16*
U.S. Cl. 604—385.2 **5 Claims**

1. A disposable phototherapy diaper intended primarily to maximize the surface area of a newborn infant exposed to phototherapy light to counteract a condition known as hyperbilirubinenemia comprising:
a sheet of flexible material permeable to an amount of biologically effective phototherapy light sufficient to reduce the concentration of bilirubin in the skin of the infant, which sheet of flexible material, when oriented in two planes prior to use, extends longitudinally between first and second ends, said first and second ends being relatively broad, extending, laterally, between left and right tabs, respectively, and having a laterally narrowed region intermediate said ends such that, when worn by the infant, said first end is contiguously receivable on the front of the infant, said second end is contiguously received on the back of the infant, and said narrowed region overlies the

crotch of the infant, said narrow region being defined between laterally opposed edges which are tapered convergingly from said left and right tabs of said first end to said narrowed region then divergingly from said narrowed region to said left and right tabs of said second end so as to closely conform to the shape of the infant;

fastening means from joining said first and second tabs of



said first end, respectively, to said first and second tabs of said second end when said diaper is worn by the infant; and

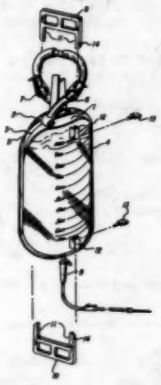
a pad of absorbent material having a size strictly coextensive with the crotch of the infant to receive and hold liquid, including urine, excretions , said flexible material in the narrowed region simultaneously serving to receive and hold bowel excretions from the infant.

4,955,877

AUTOTRANSFUSION BAG

Robert J. Kurtz, New York, and Joseph LiCausi, Port Jefferson Station, both of N.Y., assignors to BioResearch, Inc., Farmingdale, N.Y.

Filed Oct. 6, 1989, Ser. No. 418,151
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—408 **4 Claims**



1. An autotransfusion bag comprising a pair of semirigid substantially flat side wall shells having top, bottom and side edges, a flexible bag, outer surfaces of the bag being secured to inner surfaces of said semirigid sidewall shells, said flexible bag having a width substantially equal to the width of the semirigid sidewall shells so that the side edges of the pair of sidewalls hells are maintained in closely spaced relationship and the flexible bag having a length substantially greater than the length of the semirigid sidewall shells whereby when the semirigid sidewall shells are substantially flat, end portions of the flexible bag extend beyond the top and bottom edges of the semirigid sidewalls, and means extending across at least one of said top and bottom edges of said semirigid sidewall shells for retaining said sidewall shells in an outwardly curved shape to expand said flexible bag with the end portions of the flexible bag disposed between the top and bottom edges of the semirigid sidewall shells and with the side edges of the pair of sidewall shells being in closely spaced relationship.

4,955,878

KIT FOR PREVENTING OR TREATING ARTERIAL DYSFUNCTION RESULTING FROM ANGIOPLASTY PROCEDURES

Jackie R. See, Fullerton, and William E. Shell, Los Angeles, both of Calif., assignors to Biotechnology, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 848,233, Apr. 4, 1986, Pat. No. 4,820,732, which is a continuation-in-part of Ser. No. 784,160, Oct. 4, 1985, abandoned. This application Dec. 8, 1988, Ser. No. 281,430
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—181 **15 Claims**

1. A kit containing a combination of components for preventing or treating arterial dysfunction resulting from angioplasty procedures, said kit containing:

(a) a first container comprising about 25 to about 200 nanograms of a prostaglandin E_1 or a prostaglandin pharmacologically equivalent thereto for bolus injection into an artery of a patient;

(b) a second container comprising a prostaglandin E_1 or a prostaglandin pharmacologically equivalent thereto for intravenous administration after said bolus injection sufficient to provide 10 to about 100 nanograms per kilogram of body weight per minute over at least a 6 hour period;

(c) a chart cross-referencing an amount of said prostaglandin from said second container to body weights to be admixed with a saline solution to prepare a dosage amount of about 10 nanograms to about 100 nanograms per kilogram of body weight per minute.

4,955,879

URINARY DRAINAGE DEVICE

Jeanne A. Mervine, Chicago, Ill., assignor to Rehabilitation Institute of Chicago, Chicago, Ill.

Continuation-in-part of Ser. No. 28,350, Mar. 20, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 281,909
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—327 **4 Claims**

1. A urinary drainage device adapted for wear by male or female patients with indwelling or external catheters, said device comprising:

a flexible container having a first end and a second end connected along a transverse line, said container being foldable along said transverse line into a pair of chambers of substantially equal size along said transverse line;

means for connecting said container to an indwelling or external catheter, said means being connected to said first

end on said container, said means being fluidwise connected to only one of said chambers when said container is folded along said transverse line; and

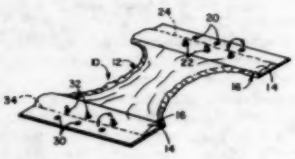
means for draining said container, said means being fluidwise connected to only the same chamber as the means for connecting when said container is folded along said transverse line, wherein when folded and in use the first and second ends and the means for connecting are at an uppermost position and the means for draining is at a lowermost position.

4,955,880

REUSABLE DIAPER PANT WITH DISPOSABLE LINER

Renee L. Rodriquez, N. 11604 Howard Ct., Spokane, Wash. 99218

Filed Feb. 24, 1989, Ser. No. 314,785
Int. Cl.[5] A61F *13/15*
U.S. Cl. 604—393 **2 Claims**



1. A diaper, comprising:

an impervious pant in the form of a sheet having elasticized leg side edges extending between opposed waistband ends and including opposed inside and outside surfaces extending along its complete length;

the waistband ends each including a fold extending across the pant between its leg side edges, each fold including an outer section and an inner section separated from the outer section by a fold line;

female snap members on the inside surface of the sheet at one of the inner or outer sections at each of the opposed waistband ends;

male snap members on the inside surface of the pant at the remaining one of the inner or outer sections at each of the opposed waistband ends for engagement with the female snap members;

an elongated absorbent liner having side edges extending between opposed transverse ends, each transverse end of the liner having openings formed through it for receiving the male snap members on the pant;

the liner including adhesive means along one surface for securing the liner to the inside surface of the pant;

whereby the outer sections of the pant are foldable over its inner sections to completely cover and sandwich the transverse ends of the liner between them with the female and male snap members engaging one another through the openings in the liner and with the engaged snap members covered by the folded outer and inner sections of the pant.

4,955,881

RUMINANT DISPENSING DEVICE

James B. Eckenhoff, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 126,460, Nov. 27, 1987, Pat. No. 4,871,544, which is a division of Ser. No. 42,197, Apr. 24, 1987, and a continuation of Ser. No. 766,456, Aug. 16, 1985, Pat. No. 4,704,148. This application Jul. 25, 1989, Ser. No. 384,613
The portion of the term of this patent subsequent to Nov. 3, 2004, has been disclaimed.
Int. Cl.[5] A61K *9/22*
U.S. Cl. 604—890.1 **9 Claims**

1. A delivery system for delivering a beneficial agent formulation to an environment of use, the delivery system comprising:

(a) a wall surrounding and forming an internal compartment, the wall comprising in at least a part of composition permeable to the passage of fluid present in the environment of use;

(b) a beneficial agent in the compartment, said beneficial agent a member selected from the group consisting of antibloat, anthelmintics, antibiotic, anti-infectious, antiparasitic, antimicrobial and anti-flea beneficial agents;

(c) exit means in the wall for connecting the internal compartment with the exterior of the delivery system for delivering the beneficial agent to the environment of use;

(d) means in the compartment for occupying an increasing amount of area in the compartment for urging the beneficial agent through the exit means in the wall for delivering the beneifical agent over time; and,

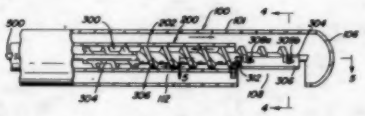
(e) density means possessing a specific gravity greater than the specific gravity of fluid present in the environment of use present in means (d) for increasing the density of means (d).

4,955,882

LASER RESECTOSCOPE WITH MECHANICAL AND LASER CUTTING MEANS

Said I. Hakky, 8547 Merrimoor Blvd. East, Largo, Fla. 34647-3145

Filed Mar. 30, 1988, Ser. No. 175,014
Int. Cl.[5] A61B *17/36*
U.S. Cl. 606—14 **17 Claims**



1. A surgical apparatus for cutting organic tissue, said apparatus comprising:

mechanical cutting means for cutting and removing said tissue;

sheath means surrounding said mechanical cutting means for enclosing said mechanical cutting means therein; and

laser means extending through said sheath means for cutting said organic tissue.

4,955,883

GLAUCOMA NEEDLE WITH A THERMAL HEAT BAND

Herbert J. Nevyas, Narberth, and Michael H. Loughnane, Philadelphia, both of Pa., assignors to Diversatronics, Broomall, Pa.

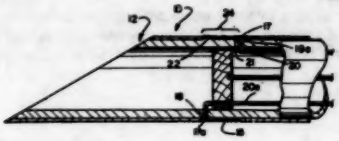
Filed Aug. 29, 1988, Ser. No. 237,798
Int. Cl.[5] A61B *17/36*
U.S. Cl. 606—28 **18 Claims**

1. A surgical glaucoma needle comprising:

an elongated needle having a sharp point at one end and an outer surface extending away from the one end;

electrically actuated thermal means extending along only a portion of the outer surface proximal the one end for creating a discrete, thermal heat band on the outer surface of the needle proximal the one end; and

electrical connectors for connecting said electrically actuated thermal means to a power supply.



4,955,884

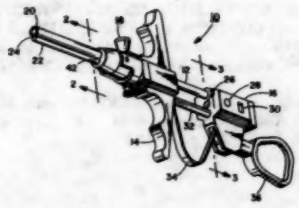
SYSTEM FOR REDUCING DRAG ON THE MOVEMENT OF AN ELECTRODE IN A RESECTOSCOPE

Benedetto Grossi; Raymond Ainger, III, both of Stamford, Conn., and Richard P. Muller, Bronx, N.Y., assignors to Circon Corporation, Santa Barbara, Calif.

Filed Jun. 2, 1988, Ser. No. 201,667

Int. Cl.[5] A61B *17/36*

U.S. Cl. 606—46 **18 Claims**



1. A system for reducing resistance on the movement of an electrode having a distal end and a shaft in a resectoscope working element, the system comprising:

electrode sheath means comprising a substantially enclosed tube having an open distal end and a proximal end for axial movement of the electrode therein, said distal end having a dimension which permits the electrode to be passed therethrough;

means for substantially sealing said sheath means proximate said proximal end; and

means positioned adjacent the path defined by axial movement of the shaft of the electrode for exiting fluids during axial movement of the shaft of the electrode thereacross, other than at said open distal end, from said electrode sheath.

4,955,885

SURGICAL SLIDER INSTRUMENT AND METHOD OF USING INSTRUMENT

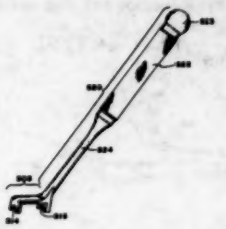
John E. Meyers, Columbia City, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

Filed Dec. 21, 1988, Ser. No. 287,244

Int. Cl.[5] A61F *2/00*

U.S. Cl. 606—53 **10 Claims**

1. A surgical instrument for maneuvering a slideable member along an elongated rod, the instrument including a distal tip and a single-membered, nonpivotal elongated handle extending therefrom, the tip including first and second extending members spaced apart from each other and rigidly connected by an interconnecting portion therebetween, thus providing a cavity having fixed, nonadjustable spacing between the first and second extending members for receiving the slideable member,



and wherein the first and second extending members each have a side which includes a recess extending into the extending member.

4,955,886

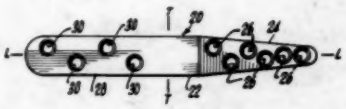
DUAL-TAPER, ASYMMETRIC HOLE PLACEMENT IN RECONSTRUCTION AND FRACTURE PLATES

Robert J. Pawlak, Montvale, N.J., assignor to The Trustees of Columbia University in the City of New York, New York, N.Y.

Filed Apr. 1, 1988, Ser. No. 176,651

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—69 **9 Claims**



1. A reconstruction or fracture plate for bridging a discontinuity in a long bone of a patient comprising:

a longitudinal axis for placement generally in alignment with a long axis of the long bone;

a transversal axis perpendicular to the longitudinal axis;

a central portion for placement over the bone discontinuity;

a first end portion for abutting placement against the long bone on one side of the bond discontinuity, the first end portion having a dual-tapered width and thickness profile for decreasing plate cross section and increasing plate flexibility along the longitudinal axis away from the central portion and the first end portion defining a first plurality of screw holes for receipt of bone screws, each hole having a central axis; and

a second end portion for abutting placement against the long bone on a second side of the bone discontinuity, defining a second plurality of screw holes for receipt of bone screws, each having a central axis;

the first and second plurality of screw holes each having a central axis pattern oriented relative to the plate longitudinal and transversal axes with plate taper and the distribution and orientation of the screw holes chosen to maintain bone screw bending strain direction and magnitude within limitations which reduce the likelihood of screw failure during the patient's bone healing process.

4,955,887

OPTICAL SURGICAL INSTRUMENT

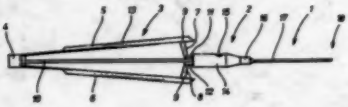
Mathias Zirm, Innsbruck, Austria, assignor to Storz Instrument Company, St. Louis, Mo.

Filed May 11, 1989, Ser. No. 350,464

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816059

Int. Cl.[5] A61B *17/32*

U.S. Cl. 606—107 **19 Claims**



1. An instrument for removal of at least a portion of an intraocular lens from an eye, the intraocular lens having a lens body and at least one haptic member, said instrument comprising:

a housing member;

an elongated hollow probe portion connected to the housing member, said probe portion having an opening adjacent its outer end and a stop means;

holder means positioned in said hollow probe portion and being movable to contact said stop means and to securely hold a haptic member positioned in said opening against said stop means; and

cutter means positioned in said hollow probe portion and being movable toward said stop means, said cutter means being used to sever a haptic member positioned in said opening against said stop means.

4,955,888

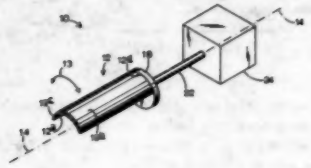
BIRADIAL SAW

D. Barclay Slocum, 241 Spy Glass Dr., Eugene, Oreg. 97401

Filed Jul. 24, 1989, Ser. No. 383,722

Int. Cl.[5] A61B *17/00*; A61F *5/00*

U.S. Cl. 606—82 **11 Claims**



1. A biradial saw blade comprising

an elongate, arcuate body having a cutting end,

said body including inner and outer arcuate surfaces, each characterized by substantially the same radius of curvature, with each surface curving about an axis offset from the axis of the other surface, which axis substantially parallels the long axis of said body.

4,955,889

APPARATUS FOR INSERTING A LENS INTO AN EYE AND METHOD FOR USING SAME

Stanley L. Van Gent, Sacramento, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed Feb. 6, 1989, Ser. No. 306,103

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—107 **15 Claims**

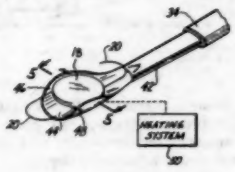
1. An insertion apparatus for an intraocular lens comprising:

an elongated member having opposite ends and including a carrying element at or adjacent one of said ends;

said carrying element being adapted to hold an intraocular lens and sized and adapted for insertion through an incision into a human eye;

said carrying element being constructed of a shape memory material and having an original open configuration in which the carrying element is adapted to receive an intraocular lens;

said carrying element being deformable from said original configuration to a folded configuration in which the carrying element is adapted to capture the intraocular lens;



said carrying element returning to said original shape in response to a temperature change whereby inserting of the carrying element through the incision into the eye with the carrying element in said folded configuration and subjecting the carrying element to said temperature change causes the carrying element to return to said original configuration and release the intraocular lens into the eye.

4,955,890

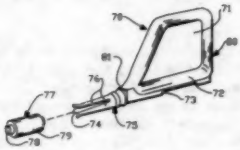
SURGICAL SKIN INCISION DEVICE, PERCUTANEOUS INFECTION CONTROL KIT AND METHODS OF USE

Ronald K. Yamamoto, and Stanley R. Conston, both of Redwood City, Calif., assignors to Vitaphore Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 819,550, Jan. 16, 1986, abandoned. This application Dec. 30, 1987, Ser. No. 139,505

Int. Cl.[5] A61B *17/32*

U.S. Cl. 606—108 **7 Claims**



1. An antimicrobial cuff and introducer device for depositing the cuff subcutaneously along a catheter at a guidewire puncture location, comprising:

(A) an anti-bacterial cuff assembly comprising (a) an anti-bacterial cuff formed of a generally tubular bio-degradable collagen matrix containing an antimicrobial agent and (b) an inner tube or sleeve of silicone elastomer material slidably supporting the antimicrobial cuff and having an inner diameter selected for applying radial compression to a catheter of selected size when inserted therein; and

(B) a cuff introducer comprising (a) a generally flat, generally rectangular handle having a groove along one edge thereof for releasably threading a guidewire and selected catheter therethrough; and (b) an introducer tube extending from the handle and having (1) a bore therethrough aligned with and communicating with the groove for receiving a guidewire and selected catheter, and (2) an outer diameter selected for releasably mounting the antimicrobial cuff assembly thereon;

(C) whereby (a) threading a catheter through the groove and introducer tube and antimicrobial cuff assembly; (b)

threading the catheter, introducer tube and antimicrobial cuff assembly along the guidewire and placing the antimicrobial cuff subcutaneously and (c) retracting the introducer leaves the antimicrobial cuff assembly in place on the catheter, allowing tissue in-growth into the antimicrobial cuff, and (d) subsequent removal of the catheter removes the inner tube therewith.

4,955,891

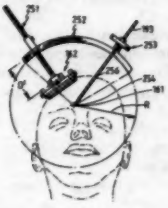
METHOD AND APPARATUS FOR PERFORMING STEREOTACTIC SURGERY

Mark P. Carol, Tampa, Fla., assignor to Ohio Medical Instrument Company, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 751,213, Jul. 2, 1985, Pat. No. 4,805,815. This application Oct. 22, 1987, Ser. No. 111,987

Int. Cl.[5] A61B *19/00*

U.S. Cl. 606—130 **28 Claims**



1. A method for performing stereotactic surgery with a medical instrument upon a target within a skull, comprising the steps of:

(a) establishing a first, predetermined geometric relationship between a positioning fixture attached to both the skull and to a support surface upon which the skull is disposed;

(b) scanning the skull to produce an image of the target within the skull with respect to the positioning fixture;

(c) transferring at least a portion of the positioning fixture to a phantom fixture and disposing the portion of the positioning fixture from the positioning fixture with respect to the phantom fixture to establish a second, predetermined geometric relationship therebetween, which is identical to the first, predetermined geometric relationship, whereby the slope of the skull where the positioning fixture is attached to the skull is duplicated within the phantom fixture;

(d) disposing a phantom target within the phantom fixture at a location which corresponds to the location of the target within the skull;

(e) determining the trajectory and distance of a medical instrument extending from the positioning fixture portion to the phantom target;

(f) attaching the portion of the positioning fixture upon the skull in the same location it was originally attached to the skull;

(g) attaching a carrier member, arc member, and instrument guide member to the positioning fixture; and

(h) inserting the medical instrument through the instrument guide member, whereby the medical instrument will intersect the target in the skull.

4,955,892

NEURAL CELL ADHESION PROTEIN NERVE PROSTHESIS

Joanne K. Daniloff, Baton Rouge, La., assignor to Louisiana State University, Baton Rouge, La.

Filed Oct. 24, 1988, Ser. No. 261,891

Int. Cl.[5] A61F *2/02*

U.S. Cl. 606—152 **14 Claims**

1. In a process wherein the severed ends of the peripheral nerve of a living mammal, the function of which is to serve a muscle impaired by the break in the nerve, are directed via the use of an implanted prosthetic device to guide the proximate nerve end toward the distal nerve end to regenerate and repair the nerve the improvement comprising adding neural cell adhesion protein to the severed nerve ends held within said

implanted prosthetic device sufficient to increase the rate of growth of the nerve vis-a-vis an implant device otherwise similar except that it does not contain said neural cell adhesion protein, to regenerate the nerve, and provide greater restitution of the muscle served by the nerve.

4,955,893

PROSTHESIS FOR PROMOTION OF NERVE REGENERATION

Ioannis V. Yannas, Newton; Dennis P. Orgill, Belmont; Howard M. Loree, II, Cambridge; James F. Kirk, Cambridge; Albert S. P. Chang, Foster City; Borivoje B. Mikic, Cambridge; Christian Krarup, Reading, and Thorkild V. Norregaard, Winchester, all of Mass., assignors to Massachusetts Institute of Technologh, Cambridge, Mass.

Continuation-in-part of Ser. No. 191,415, May 9, 1988, abandoned. This application Mar. 23, 1989, Ser. No. 327,530

Int. Cl.[5] A61B *17/08*; A61F *2/04*

U.S. Cl. 606—154 **34 Claims**

1. A prosthetic device for axonal regeneration of nerve tissue, said device comprising a porous, biodegradable template with preferentially oriented pores, made by a method comprising the steps of:

a. introducing an aqueous suspension of collagen-glycosaminoglycan into a tubular mold;

b. lowering the tube axially into a liquid cooling bath sufficient to freeze the suspension, the lowering being at a rate such that ice crystals oriented parallel to the axis are formed;

c. sectioning the mold to provide at least one prosthesis;

d. exposing the frozen material to a vacuum under conditions which cause the ice crystals to sublime, thereby forming a regeneration template with preferentially oriented pores having an average pore diameter sufficient for axonal regeneration; and

e. providing a means for maintaining contact between the regeneration template and a nerve end.

4,955,894

POSTERIOR CAPSULOTOMY KNIFE

Wesley K. Herman, Dallas, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 171,234, Mar. 22, 1988, abandoned, which is a continuation of Ser. No. 32,989, Mar. 27, 1987, abandoned, which is a continuation of Ser. No. 874,798, Jun. 13, 1986, abandoned, which is a continuation of Ser. No. 666,558, Oct. 30, 1984, abandoned. This application Jan. 30, 1989, Ser. No. 303,016

Int. Cl.[5] A61F *17/32*

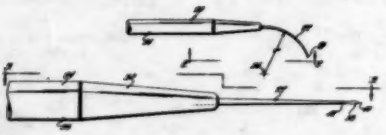
U.S. Cl. 606—167 **5 Claims**

1. An ophthalmic surgical knife for performing dicission of the posterior capsule of a human eye, comprising:

a curved shaft having a first end and a second end, said first end comprising a blade portion adapted for cutting the posterior capsule upon reciprocal rotation of said curved

shaft along its longitudinal axis, said blade portion including a flat, imperforate surface facing toward the center of curvature of the curved shaft and two opposed cutting edges which converge to form a sharp tip at said first end; and

an elongated, cylindrical handle attached to the second end of said curved shaft such that the longitudinal axis of the



handle is disposed substantially tangentially with respect to the outer periphery of said curved shaft;

wherein said curved shaft has a circular cross-section from said second end to said blade portion and is continuously tapered from said second end to said blade portion, thereby allowing the shaft to enter the eye in a self-sealing, fluid tight manner which limits the trauma to the eye and prevents the loss of vitreous fluids from the eye.

4,955,895

VASODILATING CATHETER

Yoshiaki Sugiyama, and Kyuta Sagae, both of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

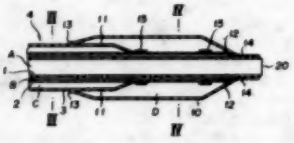
PCT No. PCT/JP87/01013, § 371 Date Jun. 22, 1989, § 102(e) Date Jun. 22, 1989, PCT Pub. No. WO88/04560, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 22, 1987, Ser. No. 382,781

Claims priority, application Japan, Dec. 23, 1986, 61-305385

Int. Cl.[5] A61M *29/00*

U.S. Cl. 606—194 **19 Claims**



1. A vasodilating catheter, comprising:

a triple-flow catheter tube having a leading end and a basal end, and comprising an inner tube opening at a leading end thereof and defining a first flow path, a middle tube encircling said inner tube and defining a second flow path jointly with said inner tube, and an outer tube encircling said middle tube and defining a third flow path jointly with said middle tube,

an at least partially cylindrical foldable balloon attached to the outer periphery of said triple-flow catheter tube so as to enclose therewith openings of said second flow path and said third flow path in the proximity of the leading end of said triple-flow catheter tube and to form a space communicating with said second flow path and said third flow path, and

three ports communicating with said three flow paths, attached to the basal end of said triple-flow catheter tube.

4,955,896

UNIVERSAL MEDICAL FORCEP TOOL

Jerre M. Freeman, 1509 Peabody, Memphis, Tenn. 38104

Filed Sep. 27, 1985, Ser. No. 780,808

Int. Cl.[5] A61B *17/28*

U.S. Cl. 606—210 **11 Claims**

1. A universal medical forcep tool comprising:

a main body portion,

said main body portion having first and second arms joined at a first end and operably extend in variable relative position responsive to external control;

a first replaceable grasping section connected to said first arm and having,

a first support handle, and

a first resilient grasping tip mounted on a distal end of said first support handle;

a second replaceable grasping section connected to said second arm and having,

a second support handle, and

a second resilient grasping tip mounted on a distal end of said second support handle;

said first replaceable grasping section operably working in cooperation with said second replaceable grasping section for gently engaging material between said first and second replaceable grasping tips;

each said first and second arms includes an end structure remote from said first end for removably receiving said first and second support handle respectively and for operably holding said first and second resilient grasping tips in a mutually opposing posture; and

said first and second resilient grasping tips operably move toward each other for gentle engagement of material between said grasping tips responsive to external manipulation of said first and second arms.

4,955,897

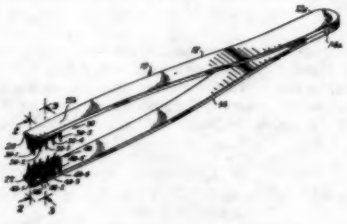
TISSUE FORCEPS

Arthur G. Ship, 9 West Dr., Larchmont, N.Y. 10538

Filed Aug. 22, 1988, Ser. No. 234,724

Int. Cl.[5] A61B *17/28*

U.S. Cl. 606—210 **8 Claims**



1. Tissue forceps for grasping tissue, comprising a first arm having first and second ends and a second arm having first and second ends, said first end of said first and second arms being coupled together, said second ends of said first and second arms forming opposing first and second jaws which are resiliently biased apart, said first and second jaws each including a

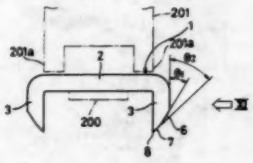
plurality of sharp, elongated teeth, each tooth on said first jaw directly opposing a tooth on said second jaw, some of said teeth extending perpendicularly from said jaws and other of said teeth extending at an acute angle from said jaws, said teeth penetrating into the tissue during use when tissue is captured between said first and second jaws by manual movement of said first jaw towards said second jaw.

4,955,898

SURGICAL STAPLE

Kanji Matsutani, Tochigi, and Masatoshi Fukuda, Utsunomiya, both of Japan, assignors to Matsutani Seisakusho Co., Ltd., Tochigi, Japan

Filed Oct. 30, 1989, Ser. No. 429,079
Claims priority, application Japan, Oct. 31, 1988, 63-275249
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—219 **4 Claims**



1. A surgical staple comprising a body having an elongated base portion and a pair of leg portions extending respectively from opposite ends of said base portion in intersecting relation to said base portion, each of said leg portions having a pair of first and second inclined surfaces at an outer periphery of a distal end portion of said leg portion remote from said base portion, said first and second inclined surfaces being inclined with respect to the axis of said leg portion, said first inclined surface being disposed intermediate the opposite ends of said leg portion, said second inclined surface extending between said first inclined surface and the distal end of said leg portion, the angle of said first inclined surface with respect to the axis of said leg portion being smaller than the angle of said second inclined surface with respect to the axis of said leg portion, said second inclined surface intersecting the outer peripheral surface of said leg portion at the distal end of said leg portion to form a sharp distal end edge.

4,955,899

LONGITUDINALLY COMPLIANT VASCULAR GRAFT

Linda V. Della Corna, Glendale; Robert C. Farnan, Tucson; William M. Colone, Phoenix, and Rajagopal R. Kowligi, Tempe, all of Ariz., assignors to Impra, Inc., Tempe, Ariz.

Filed May 26, 1989, Ser. No. 358,787
Int. Cl.[5] A61F *2/06*; A01N *1/02*
U.S. Cl. 623—1 **19 Claims**

1. A longitudinally compliant vascular graft comprising in combination:

a. a length of porous PTFE tubing having a micro-structure characterized by nodes interconnected by fibrils, said PTFE tubing having a central longitudinal axis and including an outer cylindrical wall, at least a portion of said PTFE tubing having been compressed along the central longitudinal axis thereof following the production of said PTFE tubing; and

b. a coating of a biocompatible elastomer covering the outer cylindrical wall of said PTFE tubing over at least said compressed portion of said PTFE tubing;

c. said compressed portion of said PTFE tubing coated by said biocompatible elastomer being adapted to be stretched along the central longitudinal axis of said PTFE tubing.

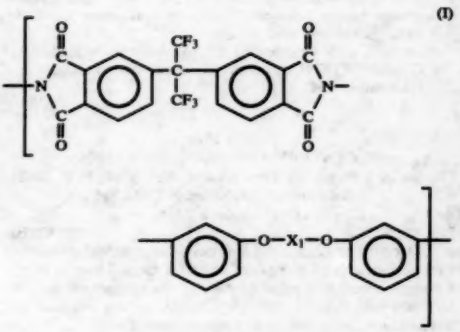
4,955,900

INTRA-OCULAR LENS

Kazumi Higashi; Toshio Nakajima; Atsushi Hino, and Sunao Inoue, all of Osaka, Japan, assignors to Nitto Denko Corporation, Osaka and Menicon Co., Ltd., Aichi, both of, Japan

Filed Jun. 9, 1989, Ser. No. 363,694
Claims priority, application Japan, Jun. 10, 1988, 63-144470
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **4 Claims**

1. An intra-ocular lens comprising a lens part and a fixing part, said lens part comprising a colorless transparent polyimide consisting mainly of a repeating unit represented by formula (I):



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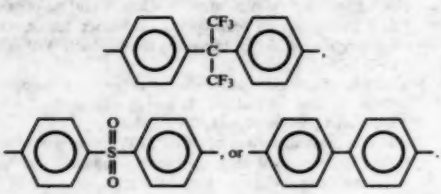
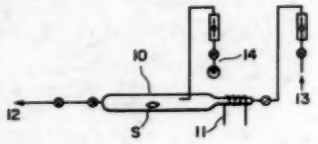


4,955,901

INTRAOCULAR IMPLANT HAVING COATING LAYER

Toshiji Nishiguchi, Kawasaki; Moriyuki Okamura, Sagamihara, and Ikuo Nakajima, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 357,783
Claims priority, application Japan, May 31, 1988, 63-133156
Int. Cl.[5] A61F 2/16; A01N 1.02; B05D 3/06
U.S. Cl. 623—6 6 Claims



1. An intraocular implant, comprising a lens substrate having on the surface thereof a coating layer, wherein said coating layer is comprised of at least one compound selected from the group consisting of;

an amino compound represented by the general formula: R_1-NH_2, wherein R_1 represents a hydrocarbon group having not more than 10 carbon atoms;

a cyan compound represented by the general formula: R_2-CN, wherein R_2 represents a hydrocarbon group having not more than 10 carbon atoms;

an azo compound represented by the general formula: R_3-N=N-R_4, wherein R_3 and R_4 represent hydrocarbon groups having not more than 10 carbon atoms in total or hydrogen atoms: and

an amino acid represented by the general formula: R_5-$CH(NH_2)COOH$, wherein R_5 represents a substituent constituted of C, H or N.

4,955,902

DECENTERED INTRAOCULAR LENS

Charles D. Kelman, 721 Fifth Avenue, New York, N.Y. 10022

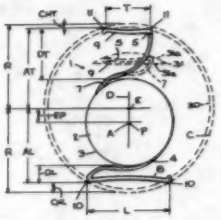
Filed Nov. 13, 1989, Ser. No. 436,300
Int. Cl.[5] A61F 2/16
U.S. Cl. 623—6 3 Claims

1. Decentered intraocular lens usable as an anterior chamber lens to correct high myopia of an intact natural lens in an eye having a decentered pupil relative to the eye optical axis, by insertion into the eye through a minimum size incision and implantation in the anterior chamber, comprising

a lens body having an optical axis, a thickened outer edge and a concave face to correct high myopia of the natural lens, and a diameter at least as large as the average diameter of the decentered pupil, and a pair of generally diametrically opposed resiliently deflectable position fixation haptics extending outwardly from the lens body,

the haptics constituting a leading haptic and a trailing haptic, each comprising a pliable strand having a stem portion attached to the lens body and a limb portion extending from the stem portion and terminating in a transverse edge portion disposed crosswise of a longitudinal diametric line passing through the lens body and intersecting both transverse edge portions, each transverse edge portion having a pair of laterally spaced apart and outwardly projecting contact lobes at the corresponding transverse ends thereof to engage an adjacent eye tissue portion at a corresponding pair of spaced apart tissue points,

the trailing haptic transverse edge portion having a length of about 2–3 mm and being arranged at a predetermined longer distance from the lens body along the diametric line than that of the leading haptic transverse edge portion concordant to the decentering increment of the pupil axis relative to the eye optical axis, and the lens body diameter and leading haptic transverse edge portion each having a length substantially larger than about 2–3 mm, so that the



pairs of contact lobes lie in a circle having its center eccentrically spaced from the lens body optical axis a predetermined increment corresponding substantially to said decentering increment of the pupil axis, and form two generally diametrically opposed pairs of laterally spaced apart fixation points, to position the intraocular lens in the anterior chamber in spaced relation to the natural lens with the lens body optical axis correspondingly decentered relative to the circle and eye optical axis and substantially coincident to the axis of the decentered pupil, and with the lens body thickened outer edge substantially centered relative to the pupil and masked by the adjacent edge of the iris sufficiently to inhibit transmission thereat of entering edge glare causing light rays.

4,955,903

SOFT INTRACAMERAL LENS

Jiri Sulc; Zuzana Krcova; Karel Smetana, and Sarka Pitrova, all of Prague, Czechoslovakia, assignors to Ceskoslovenska Akademie Ved, Prague, CSX

Division of Ser. No. 076 127, Jul. 21, 1987. This application Jul. 12, 1989, Ser. No. 379,575
Claims priority, application Czechoslovakia, Jul. 22, 1986, 5559-86
Int. Cl.[5] A61F 2/16
U.S. Cl. 623—6 1 Claim

1. A soft intracameral lens adapted for location in the posterior chamber of an eye wherein said lens has overall spherical shape comprising a front supporting and centering part which, after location of the lens in the posterior chamber of the eye, protrudes anteriorly from the posterior chamber, wherein said front part is adapted for laterally centering said lens in the eye,

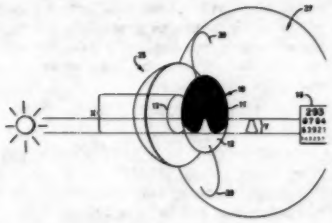
and a rear supporting part which, after the location of said lens in the posterior chamber of the eye, is adapted for contacting a capsula or a membrane of the eye, and a retaining ring located on said front supporting part comprising an anterior surface, said anterior surface extending radially rearward from the surface of the said front supporting part, wherein the outward extension of the anterior surface of said ring ranges up to about 1.5 mm and the thickness of said lens ranges front about 1 mm to about 3.5 mm, said lens being self-centering and self-supporting after location in the posterior chamber of the eye without the need for additional supporting or centering means, all surface parts of the lens which contact eye tissue being formed from a soft hydrogel which does not wound eye tissue.

4,955,904

MASKED INTRAOCULAR LENS AND METHOD FOR TREATING A PATIENT WITH CATARACTS

Neal Atebara, Boston, and David Miller, Brookline, both of Mass., assignors to The Beth Israel Hospital Association, Boston, Mass.

Filed Aug. 21, 1989, Ser. No. 396,558
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **15 Claims**



1. An intraocular lens comprising:

a transparent lens body adapted to be implanted in the human eye for focusing light rays on the retina of the eye and having means for attachment to the interior of the eye,

said lens body having an opaque mask involving only a part of the lens body such that a small aperture results near the optical center of the lens body when the lens is implanted in the eye and the pupil of the eye is constricted such that when the pupil of the eye is constricted the mask on the lens body together with the constricted pupil only allows light to reach the retina through the small aperture to create a sharp image in bright light, said opaque mask also being configured so that a larger light path through the lens body is defined by the mask such that when the pupil is dilated in dim light, a greater percentage of the transparent portion of the lens is exposed to light.

4,955,905

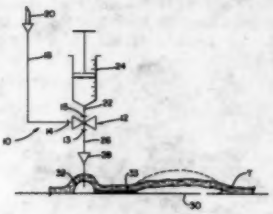
METHOD AND APPARATUS FOR MONITORING PRESSURE OF HUMAN TISSUE EXPANSION DEVICES

Andrew M. Reed, 7370 Taft Ct., Arvada, Colo. 80005

Filed Jun. 26, 1989, Ser. No. 371,523
Int. Cl.[5] A61F *2/12*
U.S. Cl. 623—8 **12 Claims**

1. In apparatus for the expansion of skin tissue wherein an inflatable envelope is implanted beneath the skin and tissue to be expanded and a liquid is injected into said envelope to cause expansion of said skin and tissue, the improvement comprising:

a fluid pressure monitoring device, and sensing means connected to said pressure monitoring device for sensing the internal pressure of liquid injected into said envelope whereby to provide a pressure reading of the liquid injected into said envelope, said sensing means including a conduit extending between said pressure monitoring device and said liquid, and filter means in said conduit for



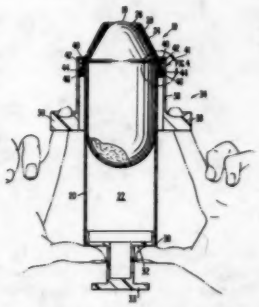
filtering any particulate matter or bacteria carried in said liquid.

4,955,906

MAMMARY PROSTHESIS INJECTOR

Peter R. Coggins, Suite B104-105, Greenville Center, Greenville, Del. 19807; Andrew L. Mitchell, 1880 Superfine La., Wilmington, Del. 19802; Paul Brothers, 112 Mill Brook Dr., Chadds Ford, Pa. 19317, and William L. Muir, 1295 W. Old Philadelphia Rd., Northeast, Md. 21901

Filed Jan. 12, 1989, Ser. No. 296,252
Int. Cl.[5] A61F *2/12*
U.S. Cl. 623—8 **14 Claims**



1. A mammary prosthesis injector comprising:

a hollow rigid walled tube having an opening at one end of said tube, said tube including inner and outer surfaces and sized to receive an implantable mammary prosthesis;

friction reducing means for reducing friction between the inner surface said hollow tube and the prosthesis, said friction reducing means including a bag at least partially located within said tube and interposed between the inner surface and mammary prosthesis, said bag sized to accommodate the mammary prosthesis within the hollow tube, and to reduce friction between said inner surface of said tube and the mammary prosthesis; and

means operatively coupled to said tube for injecting the prosthesis through said opening from within said tube.

4,955,907

IMPLANTABLE PROSTHETIC DEVICE

Walter J. Ledergerber, 29502 Anna Maria, Laguna Niguel, Calif. 92677

Division of Ser. No. 137,871, Dec. 22, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,881

Int. Cl.[5] A61F 2/12

U.S. Cl. 623—8 2 Claims

1. A biocompatible textured covering for an implant for implanting into the body comprising,

a plurality of individual polygonal shaped PTFEe cups, each of said cups having a bottom surface and raised side walls, said cups being disposed such that neighboring cups have adjacent side walls, and

a biocompatible material disposed on the bottom surface of the PTFEe cups whereby said material is capable of resisting the formation of spherical scar contracture about the implant.

4,955,908

METALLIC INTERVERTEBRAL PROSTHESIS

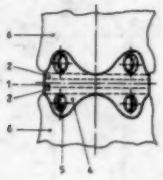
Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jun. 8, 1988, Ser. No. 203,950

Claims priority, application Switzerland, Jul. 9, 1987, 2605/87

Int. Cl.[5] A61F 5/04, 2/30

U.S. Cl. 623—17 10 Claims



1. A metallic intervertebral prosthesis for an arthodesis comprising a disk-like body having a width less than the height thereof and tapering conically from the ventral to dorsal for fitting between a pair of vertebrae to replace an intervertebral disk and having a plurality of fishplates extending from opposite sides thereof, each said fishplate having an opening for passage of a bone screw into an adjacent vertebrae.

4,955,909

TEXTURED SILICONE IMPLANT PROSTHESIS

Robert A. Ersek, Austin, Tex.; Arthur A. Beisang, Roseville, Minn., and Arthur A. Beisang, III, Des Moines, Iowa, assignors to Bioplasty, Inc., St. Paul, Minn.

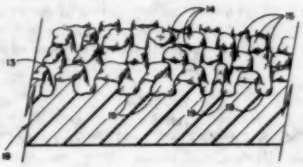
Filed Jan. 31, 1989, Ser. No. 304,764

Int. Cl.[5] A61F 2/02, 2/12

U.S. Cl. 623—11 5 Claims

1. In a soft, pliable three-dimensional prosthesis means for implantation in humans and comprising a three-dimensional solid with an outer layer of silicone rubber and having outer surfaces of the silicone rubber layer treated for formation of host-prosthesis interface, the improvement comprising:

(a) interstices formed on said outer silicone rubber surfaces to produce a substantially continuous, textured surface and characterized by a net-like, three-dimensional grid structure with pores having multi-planar, random axis orientation to provide for mechanical ingrowth of host fibrous tissue into and around said surface pores and interstices;



(b) the said net-like surface grid structure of said silicone rubber layer including substantially randomly placed formed pillars of non-uniform length and area extending outwardly from a base plane and with valleys disposed between said pillars, said pillars further having irregular outer end surfaces with indentations formed therein; and

(c) said pillars and indentations generally providing a textured surface which approximates a surface having average pore size ranging from between about 20 and 100 microns.

4,955,910

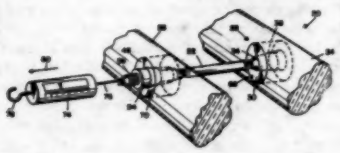
FIXATION SYSTEM FOR AN ELONGATED PROSTHESIS

Richard C. Bolesky, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Jul. 17, 1989, Ser. No. 380,998

Int. Cl.[5] A61F 2/08

U.S. Cl. 623—13 14 Claims



1. A prosthetic ligament assembly for connecting first and second spaced apart bones comprising:

first retention means fixed to the first bone having a first bore therethrough extending between a minor opening of reduced cross sectional area facing toward the second bone and a major opening of increased cross sectional area facing away from the second bone, the bore defining a first seating surface therein;

said first retention means including a first attachment member having a minor end of reduced cross sectional area and a major end of increased cross sectional area shaped similarly to said first seating surface for mating engagement therewith, said major end of said first attachment member being greater in magnitude than the minor opening in said first retention means;

second retention means fixed to the second bone having a second bore therethrough extending between a minor opening of reduced cross sectional area facing toward the first bone and a major opening of increased cross sectional area facing away from the first bone, the second bore defining a frusto-conical second seating surface;

an elongated prosthetic ligament extending between first and second ends and being attached at said first end to said first attachment member; and

said second retention means including adjustable mounting means for selectively attaching said second end of said prosthetic ligament to said second retention means to achieve a predetermined tension therein.

4,955,911

BONE IMPLANT

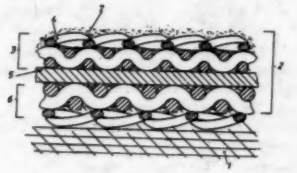
Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Apr. 20, 1989, Ser. No. 341,149

Claims priority, application Switzerland, Apr. 21, 1988, 1480/88

Int. Cl.[5] A61F *2/28*

U.S. Cl. 623—16 **7 Claims**



1. A bone implant comprising:

a plastic body;

at least two layers of wire mesh embedded in a surface of said plastic body, each layer being of equal thickness to the other and having pore sizes equal to the pore sizes of the other layer with a mesh size of 1 millimeter, each layer having a wire thickness of at least 0.5 millimeters;

a separating layer of non-porous material secured to one of said layers of wire mesh at said surface; and

a porous multi-layer wire fabric secured to said separating layer, said multi-layer wire fabric having pores in said layers thereof of increasing size from layer-to-layer in a direction away from said separating layer for ingrowth of bone tissue.

4,955,912

JOINT PROSTHESIS

Rütger Berchem, Essen, Fed. Rep. of Germany, assignor to Metalpraecis Berchem+Schaberg Gesellschaft fur Metallformgebung mit Beschrankter Haftung, Gelsenkirchen-Uckendorf, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 276,187

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1987, 3740438

Int. Cl.[5] A61F *2/30*

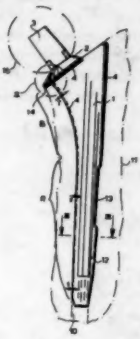
U.S. Cl. 623—18 **6 Claims**

1. A metallic prosthesis, comprising: an elongated shaft having an outer bone engaging surface, said outer surface being divided into proximal and distal regions wherein respective regions terminate in opposite proximal and distal ends, said shaft adapted to be receivable in a marrow cavity at one end of a femur;

a collar disposed on a proximal end of said shaft and adapted to seat on a resected surface of the femur, said collar having a lower bone engaging surface extending radially outwardly of the shaft;

a ball-joint means disposed on a surface opposite said bone engaging surface, said ball-joint means adapted to pivotally engage an acetabular member; and

a layer of synthetic bone material coating said shaft, said layer having a greater thickness in the proximal region and a lesser thickness in the distal region of the shaft, said lesser thickness being about 0.2 mm and said greater thickness being about 10–30 times greater than said lesser thickness wherein said bone material enables new bone tissues to grow into said layer along the length of the shaft.



4,955,913

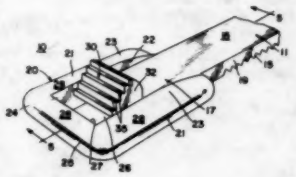
SURGICAL TIE

Walter C. Robinson, 109 E. Kenilworth Dr., Greenville, S.C. 29615

Continuation of Ser. No. 717,286, Mar. 28, 1985, abandoned. This application Jul. 31, 1989, Ser. No. 387,409

Int. Cl.[5] A61L *17/00*

U.S. Cl. 606—228 **4 Claims**



1. A surgical tie for use as a ligature in surgical procedures comprising:

an elongated flexible strap;

a frame integral with one end of said strap, said frame including a pair of longitudinally extending and spaced-apart side walls and an end wall joining the outer ends of said side walls and having a strap-receiving opening therethrough;

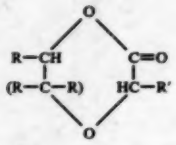
a row of teeth disposed on one longitudinal surface of said strap and arranged transversely with respect thereto;

a pawl hingedly mounted on and integral with said frame and extending into said strap-receiving opening toward said end wall, said end wall having a strap-bearing surface disposed toward said pawl and said pawl having a strap-engaging surface disposed toward said end wall and defining therewith a strap-receiving channel;

a set of teeth disposed on said strap-engaging surface of said pawl and arranged transversely with respect thereto and shaped complementary to said row of teeth on said strap, said strap being deformable into a loop encircling a bundle of wires with the other end of said strap extending into said strap-receiving channel and through the opening in said frame and therebeyond, said set of teeth being disposed toward said row of teeth as said strap is tightened about living tissue to a tensioned condition, said set of teeth upon release of said tensioned strap sequentially

moving into firm engagement with and remaining in firm engagement with successive adjacent ones of said row of teeth, any force tending to withdraw said strap from within said strap-receiving channel in a strap-loosening direction serving to move said set of teeth into more firm engagement with the engaged ones of said row of teeth firmly to wedge said strap between said strap-bearing surface and said strap-engaging surface so as to form said surgical tie into a loop around living tissues and ligate same;

said elongated strap formed of a polymer having a general formula:



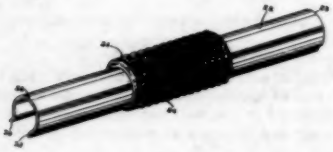
wherein R' and R are individually hydrogen, methyl or ethyl.

4,955,914

TEETHING RAIL FOR SHOPPING CART

Leslie A. Caniglia, 11935 SW. 15 Ct., Davie, Fla. 33325, and Cathy S. Palicka, 53990 Steinersville, Powhattan Pt., Ohio 32942

Continuation of Ser. No. 240,143, Aug. 26, 1988, abandoned.
This application Dec. 11, 1989, Ser. No. 449,433
Int. Cl.[5] A61J 17/00
U.S. Cl. 606—235 2 Claims



1. A teething rail for use on the tubular handle of a shopping cart comprising:

a resilient split tube having a circular circumference greater than 180 degrees and less than 360 degrees such that the split tube has longitudinal edges spaced apart a distance less than the diameter of the handle of the shopping cart;

said split tube being made of soft rubber and having an inner diameter slightly smaller than the diameter of the tubular handle of the shopping cart so that the teething rail can snap onto and off of the handle and will grip the handle;

said split tube having integral smooth, semi-spherical, rounded convex protrusions on the outside for a baby to chew on;

said protrusions having a height less than the diameter thereof for safety purposes.

4,955,915

LUNATE IMPLANT AND METHOD OF STABILIZING SAME

Alfred B. Swanson, 2945 Bonnell, S.E., Grand Rapids, Mich. 49506

Filed Jun. 2, 1989, Ser. No. 360,430
Int. Cl.[5] A61F 2/42
U.S. Cl. 623—21 7 Claims

1. A method of stabilizing an implant positioned within a carpal row of a wrist, the implant having opposed faces and defining a suture passage extending between and opening through said faces, said method comprising the steps of:

providing a first suture having an end;

stitching said first suture to a ligament;

passing said end of said first suture through said suture passage so that the end extends away from one of said faces;

providing a second suture having an end;

stitching said second suture to another ligament;

passing said end of said second suture through said suture passage so that its end extends away from said other face;

pulling the ends of said sutures to position said implant; and

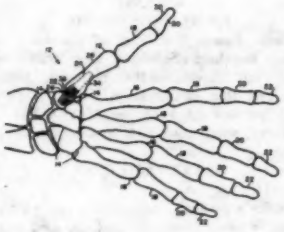
tying the ends of said sutures to secure said implant.

4,955,916

THUMB JOINT PROSTHESIS

Roger G. Carignan, Thousand Oaks, Calif.; Stanley H. Nahigian, Hunting Valley, Ohio, and Clyde R. Pratt, Somis, Calif., assignors to Techmedica, Inc., Camarillo, Calif.

Filed May 1, 1989, Ser. No. 345,298
Int. Cl.[5] A61F 2/42
U.S. Cl. 623—21 7 Claims



1. An improved carpal-metacarpal thumb joint prosthesis comprising:

a carpal component having a forward end and a rear end and having a tapered and threaded exterior and a generally U-shaped interior cavity;

a metacarpal component having a forward end and a rear end and having a tapered and threaded exterior and an axial recess extending inwardly from the rear end thereof

an insert formed of ultrahigh molecular weight polyethylene mounted in said cavity of said carpal component, said insert having a recess with curved interior walls; and

an intermediate member having a tapered forward end adapted to securely mate within said recess in said meta-

carpal component, a spherical rear end rotatably and captively mounted within said recess in said polyethylene insert in said carpal component and a neck portion connecting said forward end of said intermediate member to said rear end of said intermediate member.

4,955,917

PROSTHETIC ACETABULUM

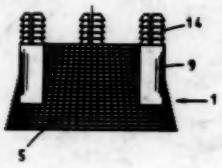
Kurt Karpf, Holderbank, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Apr. 5, 1989, Ser. No. 333,347

Claims priority, application Switzerland, Apr. 11, 1988, 1322/88

Int. Cl.[5] A61F *2/34*

U.S. Cl. 623—22 **20 Claims**



9. A prosthetic acetabulum comprising

a metal outer shell of frustum shape having a front surface and a peripheral wall extending from said front surface about a central axis;

at least three plugs extending from said shell at an outer periphery of said front surface, each said plug having a hollow radially expandable portion extending from said front surface on an axis parallel to said central axis;

a saw tooth circular toothing on an outer surface of said expandable portion of each respective plug; and

a plastic cup received in said shell to receive a femoral head.

4,955,918

ARTIFICIAL DEXTEROUS HAND

Sukhan Lee, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Filed May 30, 1989, Ser. No. 359,097

Int. Cl.[5] A61F *2/68*

U.S. Cl. 623—24 **56 Claims**

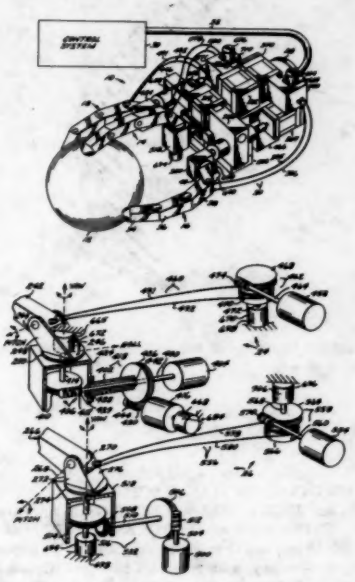
1. An artificial dexterous hand for grasping and manipulating objects, comprising:

a left thumb having a left thumb phalange means and a left thumb base, said left thumb base having a left base joint which operatively interconnects said left thumb phalange means to said left thumb base, said left thumb being associated with three separate left thumb axes, said left thumb axes corresponding to an independent left thumb pitch axis which extends axially through said left base joint and about which said left thumb phalange means pitches and mutually orthogonal, independent left thumb roll and yaw axes which run through said left thumb base and about which said left thumb rolls and yaws respectively;

a right thumb having a right thumb phalange means and a right thumb base, said right thumb base having a right base joint which operatively interconnects said right thumb phalange means to said right thumb base, said right thumb being associated with three separate right thumb axes, said right thumb axes corresponding to an independent right thumb pitch axis which extends axially through said right base joint and about which said right thumb phalange means pitches and mutually orthogonal, independent right thumb roll and yaw axes which run through said right thumb base and about which said right thumb rolls and yaw respectively; and

engagement assembly means, operatively connected to said left and right thumbs at said left and right thumb bases respectively, for causing movement of said left and right thumbs, said engagement assembly means including,

gear assembly means for causing rolling of said left and right thumbs about said left and right thumb roll axes respectively and yawing of said left and right thumbs about said



left and right thumb yaw axes respectively and pitching of said left and right thumb phalange means about said left and right thumb pitch axes respectively, and

motor assembly means, operatively connected to said gear assembly means, for selectively actuating said gear assembly means.

4,955,919

MULTI-COMPONENT JOINT PROSTHESIS WITH INCREASED WALL FLEXIBILITY FACILITATING COMPONENT ASSEMBLY

Michael J. Pappas, 61 Gould Pl., Caldwell, N.J. 07006, and Frederick F. Buechel, 76 Crest Dr., South Orange, N.J. 07079

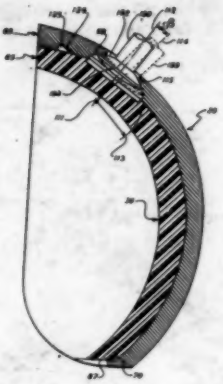
Continuation-in-part of Ser. No. 492,133, May 6, 1983, abandoned. This application Mar. 15, 1985, Ser. No. 712,370

Int. Cl.[5] A61F *2/32*

U.S. Cl. 623—22 **25 Claims**

1. A joint prosthesis comprising first and second cup-shaped components for being assembled together, the assembly of said components requiring the application thereto of assembly forces, said first component being a segmented open shell including a wall defining part spherical inner and outer surfaces, said segmented open shell has a face and a plane of symmetry; wherein the face of said segmented open shell is defined by: (i) a first planar surface substantially perpendicular to said plane of symmetry, (ii) a second planar surface substantially perpendicular to said plane of symmetry and angularly aligned to said first planar surface, and (iii) a first pair of curved surfaces on opposite sides of said plane of symmetry and defining portion of a cylinder aligned perpendicular to said plane of

symmetry and tangent to said first and second planar surfaces; wherein the aligment of said surfaces relative to one another



increases the flexibility of the wall and facilitates assembly of said components.

4,955,920

MOLDING FOR MANUFACTURING AN INNER CONICAL RECESS FOR RECEIVING AN AMPUTATED EXTREMITY AND PROCESS THEREFOR

Ulf Wellershaus, and Otto Fruzinsky, both of Duderstadt, Fed. Rep. of Germany, assignors to Otto Bock Orthopaedische Industrie Besitz-und Verwaltungs-Kommanditgesellschaft, Duderstadt, Fed. Rep. of Germany

Division of Ser. No. 867,955, May 29, 1986, Pat. No. 4,783,293. This application Aug. 25, 1988, Ser. No. 236,380

Claims priority, application European Pat. Off., May 29, 1985, 85106563.1

Int. Cl.[5] A61F *2/80*

U.S. Cl. 623—36 **3 Claims**

1. A molded part suitable for manufacturing an inner conical recess fitting which is attachable to a prosthesis for receiving a stump of an amputated extremity, comprising:

a generally conically-shaped hollow molded part comprised of a polymer material which is selectively heat-shrinkable in response to application of an external effect, said molded part being open at its base and having at its base an outwardly curled lip portion, and said molded part having generally the shape of the stump which it is intended to receive and having a dimension in each direction except around the inner circumference of the lip portion which is larger than the stump which it is intended to receive.

4,955,921

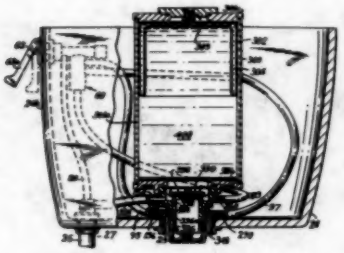
FLUSHING MECHANISM USING PHASE CHANGE FLUID

Peter A. Basile, Lawrenceville; Ashvani K. Madan, Ocean; Fred E. Snyder, Princeton Junction, all of N.J., and Harold M. Stillman, Scarsdale, N.Y., assignors to American Standard Inc., New York, N.Y.

Continuation-in-part of Ser. No. 440,363, Nov. 30, 1989. This application Feb. 14, 1990, Ser. No. 479,891

Int. Cl.[5] E03D *3/10*

U.S. Cl. 4—354 **18 Claims**



1. A flushing mechanism for flushing a bowl with liquid comprising a containment vessel adapted to hold a predetermined amount of said liquid, collapsible bladder means supported in said containment vessel and a predetermined amount of a phase change fluid provided in said collapsible bladder means, inlet means for introducing said liquid under pressure into said containment vessel to collapse said bladder means while said phase change fluid converts to a liquified state, outlet means on said containment vessel coupleable to said bowl for releasing said liquid in said containment vessel into said bowl, sealing means for releaseably sealing said outlet means, and actuation means for selectively actuating said sealing means to open said outlet means to release liquid in said containment vessel into said bowl under the force exerted by said bladder means as it expands while the phase change fluid changes from a liquified state to a gaseous state.

4,955,922

URINE-COLLECTING APPARATUS FOR WHEEL-CHAIR

Ryugo Terauchi, 1019-359 Kuden-cho, Sakae-ku, Yokohama Kanagawa Pref., Japan

Continuation of Ser. No. 287,717, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 183,001, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 863,112, Jul. 21, 1986, abandoned, which is a continuation of Ser. No. 644,313, Aug. 24, 1984, abandoned. This application Dec. 22, 1989, Ser. No. 455,302

Int. Cl.[5] A47K *11/02*

U.S. Cl. 4—480 **6 Claims**

1. A urine-collecting apparatus for a wheel-chair or a special purpose chair comprising:

a seat-plate;

said seat-plate having a pair of parallel spaced apart U-shaped rails for attaching said seat-plate to the frame of the wheel-chair or special purpose chair, said rails being spaced apart by an integrally connected flat plate having an upperside and an underside as well as a front and rear edge, said plate supporting an occupant thereon;

said flat plate having a central front portion including a short generally U-shaped elongated cut-out intersecting said front edge, said cut-out being disposed forwardly and generally beneath the position of the genitals of an occupant seated on said plate;

a spongy air permeable cushion disposed on said flat plate for helping to cushion the buttocks of said occupant, said spongy cushion having a central front portion including a short generally U-shaped elongated cut-out disposed forwardly in overlying registration with said short cut-out in said flat plate;

a urine-receiving part adapted to be attached at one end to the genital part of special-purpose underpants or drawers worn by a user of said wheel-chair or special-purpose chair and attached at its opposite end to one end of a relatively short tube, said tube being attached at its other end to a removable closed urinal tank;

a urinal case attached on the underside of said flat plate under said flat plate cut-out for housing said removable closed urinal tank;

said urinal case including means defining an opening aligned with said cut-outs for enabling said tube to extend therethrough to provide fluid communication between said urine-receiving part and said urinal tank to permit urine to flow to the urinal tank under the force of gravity;

said means defining placement of opening further enabling an said urinal tank inside said urinal case, and removal therefrom for disposing of said tank contents, in a convenient manner; and

whereby said occupant can readily urinate into said urine-tank through said urine-receiving part, without disrobing and without assistance, while assuming a seated posture with the tube operationally attached between the urine-receiving part and the urinal tank by insertion of said tube through said U-shaped cut-outs and into said urinal tank.

4,955,923

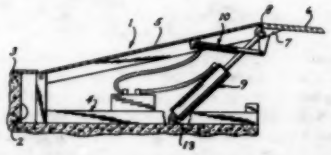
HYDRAULICALLY OPERATED DOCKBOARD

Martin P. Hageman, Mequon, Wis., assignor to Kelley Company Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 276,241, Nov. 25, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 466,054

Int. Cl.[5] E01D *1/00*

U.S. Cl. 14—71.7 **10 Claims**



1. A hydraulically operated dockboard, comprising a supporting structure, a ramp hinged at its rear edge to the supporting structure and movable between a generally horizontal position and an upwardly inclined position, a lip hinged to the forward edge of the ramp and movable between a downwardly hanging pendant position and outwardly extending position, hydraulic cylinder means interconnecting said ramp and said supporting structure and including a cylinder to contain a hydraulic fluid and a piston slidable in said cylinder, said piston having a longitudinal passage therethrough, a valve member disposed in said passage and having an open and a closed position, means for biasing said valve member to said open position whereby said fluid can flow freely through said passage as the piston moves in said cylinder, and means responsive to a predetermined downward force being applied to the ramp for closing said valve member and preventing descent of the ramp.

5. A hydraulically operated dockboard, comprising a supporting structure, a ramp hinged at its rear edge to the supporting structure and movable between a generally horizontal position and an upwardly inclined position, a lip hinged to the forward edge of the ramp and movable between a downwardly hanging pendant position and outwardly extending position, a first hydraulic cylinder unit interconnecting the ramp and the supporting structure, a second hydraulic cylinder unit interconnecting the ramp and the lip, a hydraulic system for supplying hydraulic fluid to said first and second cylinder units and including a reservoir for hydraulic fluid, first conduit means interconnecting said reservoir and said first cylinder unit, pumping means for supplying hydraulic fluid under pressure through said first conduit means to said first cylinder unit to thereby actuate said first cylinder unit and raise the ramp, second conduit means connecting said first conduit means to said second cylinder unit, valve means connected in said second conduit means, means responsive to a first elevated fluid pressure in said system in excess of that required to raise the ramp for opening said valve means to thereby supply pressurized fluid to said second cylinder unit to extend said lip, means responsive to a decrease in fluid pressure from said first pressure to a second fluid pressure substantially beneath said first pressure for closing said valve means and returning fluid from said second cylinder unit to said reservoir, and adjusting means for selectively adjusting the magnitude of one of said pressures independently of the other of said pressure.

4,955,924

WINDOW GLAZE CLEANING

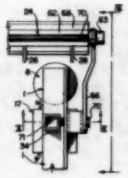
Daniel J. Gorman, 740 Lonsdale Rd., Ottawa, Ontario, Canada K1K 0K2

Filed Jun. 13, 1989, Ser. No. 365,426

Claims priority, application Canada, Jun. 14, 1988, 569468

Int. Cl.[5] A47L *1/00*

U.S. Cl. 15—103 **5 Claims**



1. A window glaze cleaning device, comprising:

(a) an outer frame for, in operation, being placed on an outer, glazed surface of a window,

(b) an inner frame for, in operation, being placed on an inner glazed surface of that window face-to-face with the outer frame,

(c) at least three outer bearings attached to the outer frame for, in operation, holding the outer frame closely spaced from the outer glazed surface,

(d) at least three inner bearings attached to the inner frame for, in operation, holding the inner frame closely spaced from the inner glazed surface,

(e) first magnet means attached to the outer frame,

(f) second magnet means attached to the inner frame and oriented to present opposite polarities when, in operation, placed face-to-face for magnetic attraction with the first magnet means, whereby the inner and outer frames will be

held face-to-face, by the magnetic attraction, closely spaced from their respective glazed surfaces,

(g) a wiper blade assembly attached to and extending across the outer frame for, in operation, wiping cleaning liquid from the outer glazed surface,

(h) nozzle means attached to the outer frame for, in operation, attachment to a source of cleaning liquid and directing that cleaning liquid into the path of the wiper blade assembly, and

(i) a support assembly for, in operation, supporting the weight of the outer frame for movement of the outer frame relative to the outer glazed surface by the magnetic attraction between the first and second magnet means when the inner frame is moved from position on the inner glazed surface to another position thereon.

4,955,925

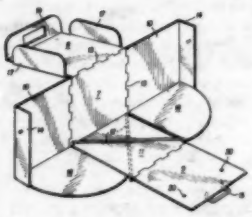
RAKER TAKER I

Rita J. Platti, 8041 Mariners Dr., Apt. #3810 , Stockton, Calif. 95209

Filed Sep. 13, 1989, Ser. No. 406,454

Int. Cl.[5] A47L *13/52*; B65D *5/00*

U.S. Cl. 15—257.6 **1 Claim**



1. A leaf collecting device comprised of top, bottom, front, back, and two side walls; said bottom wall having upper and lower surfaces; each of said front, back and side walls including top, bottom and side edges; said top and bottom walls including front, back, and two side edges;

first and second hinge means which enables the device to be placed in an open or closed position; said first hinge means hinges said back edge of said back wall to said back edge of said top wall and said side edges of said back wall to one of said side edges of said side walls and said second hinge means hinges said front edge of said bottom wall to said bottom edge of said front wall;

flaps located at said bottom edge of each of said side walls and adapted to extend orthogonally therefrom;

a first guide rail extending diagonally across said upper surface of said bottom wall;

a second guide rail extending diagonally across said lower surface of said bottom wall; said guide rails being adapted to receive said flaps in order to secure said side walls to said bottom wall;

side flanges located at the other of said side edges of said side walls adapted to extend orthogonally therefrom to overlap said front wall; each of said side flanges having a protruding pin thereon;

holes in said front wall positioned to receive said pins when said flanges overlap said front wall;

a handle located at the front wall;

top flanges located on said front and side edges of said top wall and adapted to extend orthogonally therefrom to overlap said front and side walls; said top flange located at said front edge of said top wall includes a hole positioned to receive said handle when said flange overlaps said front wall.

4,955,926

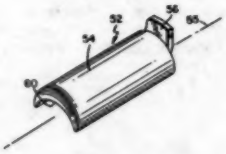
DEVICE FOR ADJUSTING ALIGNMENT OF A WHEEL

Gerald A. Specktor, St. Paul, and John Specktor, Golden Valley, both of Minn., assignors to Shim-A-Line, Inc., Minneapolis, Minn.

Continuation of Ser. No. 83,564, Aug. 7, 1987, abandoned. This application Jun. 8, 1989, Ser. No. 366,883

Int. Cl.[5] B25B *27/14*

U.S. Cl. 29—271 **5 Claims**



1. A device for adjusting alignment of a wheel attached to a vehicle by a suspension system having a rod member affecting the caster of the wheel, a portion of the rod member being disposed within a bushing attached to the vehicle, the device comprising:

a longitudinal member having an arcuate cross section for insertion between the portion of the rod member disposed within the bushing and the bushing and further including stop means fixedly attached to the longitudinal member for selectively positioning the member longitudinally between the bushing and the rod member.

4,955,927

METHOD OF OPERATING HARNESS MAKING MACHINE

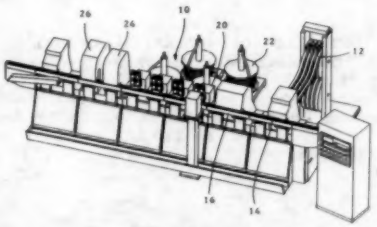
Bruno Aiello, Alta, Italy, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 13, 1988, Ser. No. 283,698

Claims priority, application United Kingdom, Mar. 10, 1988, 8805474

Int. Cl.[5] H01R *43/04*

U.S. Cl. 29—861 **5 Claims**



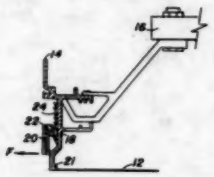
1. A method of operating an electrical harness making machine on which a variety of electrical connectors may be used with a common set of tooling, said machine operable to terminate a plurality of discrete wires to a pair of electrical connectors by causing said connectors to traverse a path extending through a plurality of operating zones, where said variety of electrical connectors comprises a family having a plurality of identical external dimensions normal to said path, and a plurality of different internal features to accommodate a different contact element for each member of said family, whereby said machine is operated by sensing only said identical dimensions of the electrical connectors as they traverse said path to produce an electrical harness consisting of a plurality of discrete wires terminated at respective opposite ends to a pair of electrical connectors, whereby the operating parameters for said machine are the same for each member of said family.

4,955,928

TENSIONING CONNECTOR FOR RETAINING SIGN MEMBRANES

James A. Tanner, Westerville, Ohio, assignor to Signstrut, Ltd., Dublin, Ohio

Filed Apr. 18, 1989, Ser. No. 339,685
Int. Cl.[5] G09F 17/00
U.S. Cl. 40—603 **19 Claims**



1. An improved, manually releasable mechanical connector having two connecting components with generally interlocking surfaces for restraining one of its components against sliding translation in a selected direction relative to its other component and against rotation relative to its other component to tension a web, wherein the improvement comprises:

said interlocking surfaces having interengaging, mating, ridges with tips thereon and valleys therebetween, the cross section of the ridges having a generally sawtooth configuration with both of the surfaces of each sawtooth ridge making an acute angle with a plane of the ridge tips on the same side of a normal to said plane of the ridge tips, means for detachably connecting one of said components to a web, the other of said components including means for supporting the web in a web plane, the web plane extending at a non-zero angle to the plane of the ridge tips, said means for supporting the web including a tensioning edge on said other of said components which is spaced away from the ridges of said other of said components, around which the web is engageable with interlocking interengagement of the two connecting components, said one of said components which is detachably connected to the web having said interengaging ridges on one side only, an opposite side of said one of said components being free of ridges and being freely accessible and out of contact with said other of said component for movement of said one of said components along said other of said components.

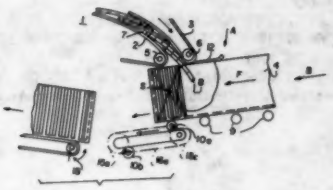
4,955,929

DEVICE FOR INTRODUCING MATERIAL INTO CONTAINERS

Hartmut Klapp, Kaarst, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jan. 17, 1989, Ser. No. 298,083
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 3801279
Int. Cl.[5] B65B 5/10, 39/00
U.S. Cl. 53—244 **14 Claims**

1. In a device for introducing material into containers with a material-release mechanism and with a supporting structure that supports a container below the material-release mechanism and that can advance the container past the material-release mechanism, the improvement wherein the supporting structure has a bearing on which the container pivots, whereby the point at which said bearing supports the container is displaced to the rear as the container travels forward such that the displacement int eh center of gravity of the container as it fills up both occasions an advance of the container in relation to the



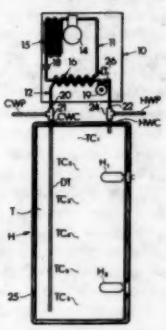
material-release mechanism and brakes the container as it advances.

4,955,930

VARIABLE WATER FLOW CONTROL FOR HEAT PUMP WATER HEATERS

Glen P. Robinson, Jr., 1050 Mt. Paran Rd., SW., Atlanta, Ga. 30327

Filed Jul. 21, 1989, Ser. No. 384,148
Int. Cl.[5] F25B 7/00
U.S. Cl. 62—79 **15 Claims**



10. A method of heating water in a water tank to the normal predetermined tank temperature associated with water heaters using a heat pump with a condenser heat exchanger comprising the steps of:

(a) connecting the condenser heat exchanger between the upper and lower ends of the water tank;

(b) operating the heat pump when the tank temperature falls below the normal predetermined tank temperature;

(c) detecting the refrigerant pressure in the condenser heat exchanger;

(d) when the refrigerant pressure in the condenser heat exchanger exceeds a first prescribed pressure corresponding to a water temperature sufficient for immediate use but below the normal predetermined tank temperature, circulating the water from the lower end of the tank to the heat exchanger and from the heat exchanger to the upper end of the tank until the refrigerant pressure is lowered a prescribed amount;

(e) stopping the circulating of the water through the heat exchanger when the refrigerant pressure has been lowered said prescribed amount; and,

(f) repeating steps (d) and (e) until the normal predetermined tank temperature is reached.

4,955,931

RESORPTIVE THERMAL CONVERSION APPARATUS

Vinko Mucic, Wallderf, Fed. Rep. of Germany, assignor to TCH Thermo-Consulting-Heidelberg GmbH, Heidelberg, Fed. Rep. of Germany

PCT No. PCT/EP88/00607, § 371 Date Feb. 27, 1989, § 102(e) Date Feb. 27, 1989, PCT Pub. No. WO89/00665, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 7, 1988, Ser. No. 335,966

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723938

Int. Cl.[5] F25B *27/00*

U.S. Cl. 62—238.3 4 Claims

1. A heat pump comprising: circuit means operated with a binary working medium for converting thermal energy supplied by an external heat source to thermal energy at a different temperature level, said circuit means comprising a first solution circuit having a forward pass and a return pass and a first evaporator at a first pressure level, compressor means for raising the pressure of a gaseous component of said binary working medium from said first evaporator to a higher pressure level in a resorber, said circuit means also comprising a second solution circuit having a forward pass and a return pass and a second evaporator at a second pressure level higher than said first level, expansion means for lowering the pressure of a gaseous component of said binary working medium of said second evaporator to a lower pressure level in an absorber, means free of control means, for directly coupling said forward pass of said first solution circuit with said return pass of said second solution circuit and said return pass of said first solution circuit with said forward pass of said second solution circuit at a common medium pressure level representing the higher pressure level in said first solution circuit and the lower pressure level in said second solution circuit.

4,955,932

PADLOCK

Anatoly Kofman, 8 Tamar Street, Neve Monoson, Israel

Filed Apr. 2, 1990, Ser. No. 502,890

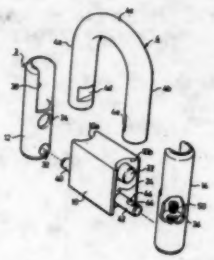
Int. Cl.[5] E05B *67/22*

U.S. Cl. 70—39 13 Claims

1. A padlock, comprising: a housing formed with a pair of sockets, a shackle receivable in and removable from said sockets, and a pair of locking bolts projectable into said sockets for locking the shackle therein and retractable from said sockets to permit removal from the shackle therefrom;

characterized in that said housing includes a body member carrying said locking bolt, and a pair of sleeves defining said sockets;

said sleeves being removably attached to opposite sides of said body member by fasteners received in said sockets so



as not to be accessible when the shackle is locked within said sleeves.

4,955,933

DEVICE FOR MEASURING THE FRICTION ON A SURFACE

Matti Sistonen, Kalasiliskentie 6 E 46, SF-02620 Espoo, Finland

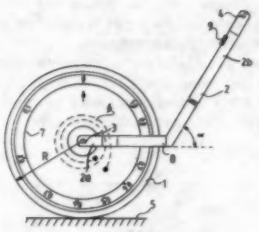
PCT No. PCT/FI87/00087, § 371 Date Jan. 3, 1989, § 102(e) Date Jan. 3, 1989, PCT Pub. No. WO88/00337, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 25, 1987, Ser. No. 295,215

Claims priority, application Finland, Jul. 4, 1986, 862834

Int. Cl.[5] G01N *19/02*

U.S. Cl. 73—9 1 Claim



1. A device for measuring the friction on a surface, comprising a measuring wheel to ride on said surface, an axle to rotatably support said measuring wheel, a rigid arm, said arm including a first section having a first end secured to said axle and having a second end, said first section of the arm being disposed substantially horizontal, said arm also including a second section connected to the second end of said first section and extending upwardly from said first section at an obtuse angle, spring means attached between the measuring wheel and the axle for resisting rotation of the measuring wheel when said measuring wheel is moved on said surface, inclination indicator means secured to said arm for indicating the inclination of said arm, a handle secured to the upper end of said second section of the arm, said handle being rotatable on the upper end of said arm about an axis parallel to said axle, said first and second sections of said arm being unsupported from said surface except for the connection to said measuring wheel.

4,955,934

MEASURING DEVICE WITH A TEST TAPE CASSETTE

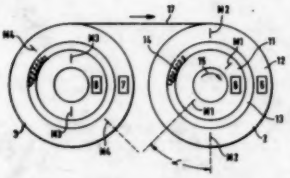
Werner Stehr, Nordstetter Str. 26, 7240 Horb-Ahldorf, Fed. Rep. of Germany

Filed May 3, 1989, Ser. No. 346,796

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816353

Int. Cl.[5] G01L *3/14, 5/00*

U.S. Cl. 73—862.340 8 Claims



1. Measuring device with a test tape cassette for measuring the torque occurring on the hubs of the two tape spools, in which the hubs are rotatable against the action of a spring with respect to the spool bodies and having markings on the hubs and spool bodies, wherein the rotation angle between the markings of a hub and the associated spool body is established by means of sensors as a measure for the torque, said sensors being connected by connecting means to a test circuit located outside the test tape cassette, wherein the sensors are positioned on a printed circuit board, which forms a surface of the test tape cassette.

4,955,935

GEAR SHIFT DEVICE FOR AUTOMOTIVE VEHICLE

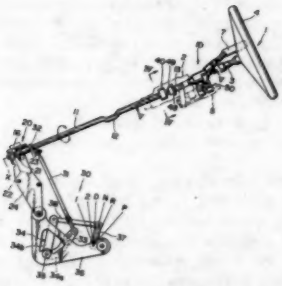
Kazuo Katayama, Kure, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 27, 1988, Ser. No. 290,119

Claims priority, application Japan, Dec. 25, 1987, 62-330593

Int. Cl.[5] B62D *1/18*

U.S. Cl. 74—473 SW 33 Claims



1. An automotive vehicle transmission shift device of the type having a transmission shift control rod supported substantially in parallel with a steering column by a steering column supporting member and a transmission shift lever which is located on said transmission shift control rod and is movable to displace axially and rotationally said transmission shift control rod so as to place a transmission of an automotive vehicle in any desired range, said transmission shift device comprising:

locking means supported by said supporting member for locking said transmission shift control rod moved to a range selecting position when placing said transmission in a predetermined range; and

absorbing means disposed between said transmission shift lever and said locking means for absorbing operating power applied from said transmission shift lever in said predetermined range to said locking means.

4,955,936

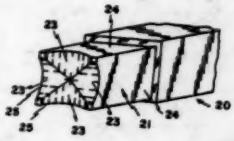
SCREW DRIVER TIP

Harley W. Douglas, 4 Brickwood Boulevard, Ingersoll, Ontario, Canada N5C 3S1

Filed Aug. 16, 1989, Ser. No. 394,451

Int. Cl.[5] B25B *23/00*

U.S. Cl. 81—441 1 Claim



1. A screw driver having a shank with a screw engaging tip for mating within a recess on the face of a screw, said recess having walls and a base:

said tip having side walls and a face for mating insertion within said recess and cutting edges on said tip defined between said side walls and said face and adapted to scrape debris from the walls of said recess during said mating insertion; said recess is substantially rectangular in configuration and said tip has four side walls and a recessed face; and said tip face comprises a recessed center extending outward in four concave arcuate surfaces to four flat facial corners with said sidewalls to define cutting edges between said corners and said side walls.

4,955,937

METHOD OF MANUFACTURING A MASTER INTENDED FOR THE MANUFACTURE OF PROJECTION SCREENS AND TOOL FOR CARRYING OUT THE METHOD

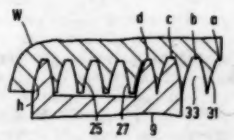
Marinus J. J. Dona, and Johannes M. M. Swinkels, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 134,667, Dec. 18, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 371,680

Claims priority, application Netherlands, Oct. 7, 1987, 8702384

Int. Cl.[5] B23B *5/00*; G03B *21/60*

U.S. Cl. 82—1.11 1 Claim



1. A method of manufacturing a master for the fabrication of projection screens, such screens comprising a substrate of transparent material provided on one side with a lens structure consisting of a pattern of parallel rectilinear lens elements which are separated by grooves, the method comprising forming a pattern of parallel rectilinear grooves and ribs corresponding to the lens structure on one side of a plate of machinable material by a tooling operation,

characterized in that the grooves are formed by:

(a) precutting in successive steps grooves separated by a

pitch distance p by a first precutting operation using a first precutting chisel;

(b) carrying out a second precutting operation in successive steps on each of the precut grooves, the operation consisting of deepening the bottom while simultaneously profiling only one of the flanks of each precut groove using the front edge and one side edge of a second precutting chisel;

(c) carrying out a finishing operation in successive steps on each of the precut grooves, the operation consisting of simultaneously profiling the bottom and only the other flank of each of the precut grooves using the front edge and one side edge of a finishing chisel;

the successive steps of the second precutting operation and the finishing operation being carried out simultaneously on adjacent flanks of adjacent grooves during at least a portion of the manufacture, whereby the ribs formed by the adjacent flanks are loaded substantially uniformly in the transverse direction during these operations.

4,955,938

AMMUNITION, PREFERABLY FOR USE IN HIGH-ANGLE FIRE

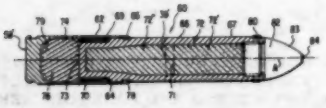
Rudolf Romer, Kaarst; Wilfried Becker, Düsseldorf, and Bernhard Bisping, Ratingen, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 448,508, Dec. 9, 1982, abandoned. This application Nov. 29, 1988, Ser. No. 279,236

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1981, 3148829

Int. Cl.[5] F42B *5/00, 10/06, 10/32, 12/10*

U.S. Cl. 102—430 **25 Claims**



1. An ammunition unit for use in an automatic tubular weapon having a barrel that can be selectively oriented to effect flat trajectory or high-angle trajectory fire, said ammunition unit being constructed for one of flat trajectory fire and high-angle trajectory fire, and wherein:

said ammunition unit is a one-piece unit and comprises a propellant charge means, including at least a cylindrical member having a bottom face at one end, for providing a propellant charge, a ballistic payload projectile secured in said cylindrical member of said propellant charge means at the end thereof remote from said bottom face and having a bottom member which faces said propellant charge means and delimits the rear end of said projectile, and a payload disposed within said projectile;

said ammunition unit has a given length, outer diameter and external shape, with the portion of said projectile which projects out of said cylindrical member of said propellant charge means having substantially the same outer diameter as said cylindrical member, and with said projectile of said ammunition unit having a main cylindrical portion of constant diameter and a short ogival front end portion;

said propellant charge extends between said bottom face and said bottom member, with the quantity of said propellant charge being a function of the type of trajectory over which the ammunition is to be fired, and with the distance between said bottom member and said bottom face of said ammunition unit being greater for flat trajectory fire than for high-angle trajectory fire, and with said ammunition unit containing a greater quantity of propellant charge for flat trajectory fire than for high-angle trajectory fire;

said projectile of said ammunition unit is shorter for flat trajectory fire than for high-angle trajectory fire; and

said ammunition unit has a smaller quantity of payload for flat trajectory fire than for high angle trajectory fire.

4,955,939

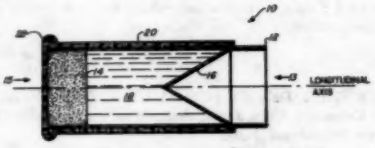
SHAPED CHARGE WITH EXPLOSIVELY DRIVEN LIQUID FOLLOW THROUGH

James A. Petrousky, Port Tobacco, Md.; Joseph E. Backofen, and Donald J. Butz, both of Columbus, Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 2, 1983, Ser. No. 471,381

Int. Cl.[5] F42B *12/10*

U.S. Cl. 102—476 **1 Claim**



1. An explosive device for perforating the wall of a target and ejecting a liquid through the perforation for disrupting structure behind the target wall, comprising:

a hollow case formed of plastic material having two opposing ends, an inner surface and an outer surface, said case adapted to be substantially consumed by burning and be free of fragmentation when the device is detonated;

a shaped charge liner formed of plastic material in fluid-tight attachment with said case inner surface adjacent one end thereof and facing in an outward direction for placement toward a target to be perforated;

a first explosive contained within said case at the second end thereof;

a shockwave transmitting liquid material located in the case between the shaped charge liner and the first explosive, whereby, upon detonation, the first explosive creates high pressure gases the shockwave of which is transmitted through the liquid material for collapsing the shaped charge liner and causing it to perforate the target wall and cause the liquid material to follow through the perforation; and

a second explosive in the form of a sheet completely covering the outer surface of the case and completely covering the second end of the case including the first explosive charge;

whereby, upon simultaneous detonation of the first and second explosives, forces exerted inwardly by the second explosive balance the outward forces of the first explosive to prevent their radial expansion and expansion toward second end to confine its forces in the direction of the shaped charge liner, thereby confining said liquid material to a well defined shape and causing substantially all of said material to pass through the wall perforation.

4,955,940

APPARATUS FOR CARRYING LOADS, PARTICULARLY FOR OR AT A PALLET

Sven Wellenan, Perstorp, S-540 30 Fagersanna (SE), Sweden

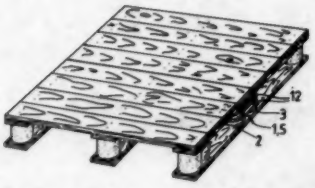
PCT No. PCT/SE87/00567, § 371 Date May 18, 1989, § 102(e) Date May 18, 1989, PCT Pub. No. WO88/04263, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 30, 1987, Ser. No. 358,361

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1986, 8632080; Jun. 20, 1987, 8707837

Int. Cl.[5] B65D *19/00*

U.S. Cl. 108—56.1 **9 Claims**



1. Apparatus for carrying loads, comprising a pair of laterally-adjacent load supports having coplanar upper platforms, lower runners along opposite side edges of said platforms to couple said laterally-adjacent load supports together with their platforms and runners co-planar and spacers having bodies between said platforms and said runners, at least one of said bodies in each support confronting one of said bodies in the laterally-adjacent support and being held together by severable holding means.

4,955,941

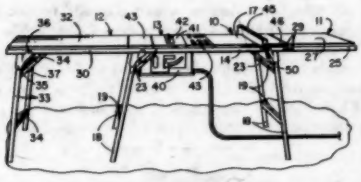
SUPPORT TABLE FOR BENCH SAW

Tony Rousseau, 1712 - 13th St., Clarkston, Wash. 99403

Filed Jan. 23, 1989, Ser. No. 299,622

Int. Cl.[5] A47B *1/00*

U.S. Cl. 108—65 **4 Claims**



1. A foldably collapsible table, having a top structure to support a bench saw having a bench saw blade, said bench saw table being rectilinear said bench saw having an undersurface inwardly adjacent two opposed side edges for support within an orifice defined in the table top structure and said bench saw being supported at a spaced distance above a surface supporting said table, comprising, in combination:

a table frame structure having similar elongate spaced coplanar rails with upper and lower surfaces,

said rails being structurally joined in parallel relationship by at least three cross supports interconnected with the lower surfaces of the rails, with end cross supports substantially at each opposed end of the rails and at least one medial cross support,

said rails extending a spaced distance above the cross supports and being spaced apart to receive therebetween said bench saw table to be supported in the table frame structure and

one of said end cross supports and an adjacent medial cross support positioned to support the undersurface of opposed side edges of said bench saw table to be supported in the table frame structure;

a table top element, supported in the table frame structure between the rails and on cross supports to form a table top element over the portion of the table frame structure not occupied by said bench saw table said bench saw table; and

opposed sets of pairs of similar legs spaced to communicate with each rail, one leg set pivotally carried substantially at each end of the spaced rails for folding motion relative to the rails and each said leg set having releasable means for maintaining a supportative mode.

4,955,942

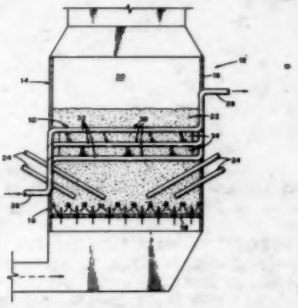
IN-BED TUBE BANK FOR A FLUIDIZED-BED COMBUSTOR

Lloyd F. Hemenway, Jr., Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 8, 1989, Ser. No. 390,849

Int. Cl.[5] F22B *1/00*

U.S. Cl. 122—4 D **7 Claims**



1. An in-bed tube bank for a fluidized-bed combustor, said tube bank comprising at least one boiler tube and a plurality of selectively spaced boiler tube sections for being immersed in the fluidized-bed of said combustor, and further comprising at least one support member for joining said tube sections, said support member engaging and extending substantially the length of said tube sections, and spanning said preselected space therebetween, whereby boiler tube wastage due to stress on said tubes from in-bed forces and due to vibration is mitigated.

4,955,943

METERING PUMP CONTROLLED OIL INJECTION SYSTEM FOR TWO CYCLE ENGINE

Robert J. Hensel, and William G. Fenrich, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.

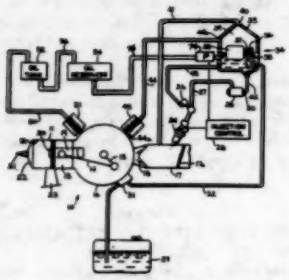
Continuation-in-part of Ser. No. 176,698, Apr. 1, 1988, Pat. No. 4,887,559. This application Jul. 31, 1989, Ser. No. 388,016

Int. Cl.[5] F01M *3/02*

U.S. Cl. 123—73 AD **5 Claims**

1. An oil injection system for a two cycle crankcase compression internal combustion engine having a fuel supply system supplying fuel to said engine, an oil supply system supplying oil to said fuel supply system, fuel supply control means controlling the amount of fuel supplied to said engine by said fuel supply means, a metering pump in said oil supply system controlling the amount of oil supplied to said fuel supply system by said oil supply system, said metering pump being controlled by said fuel supply control means to control the fuel-oil

ratio, wherein both said fuel supply system and said metering pump are controlled by said fuel supply control means to



variably control the amount of fuel supplied to said engine and also the amount of oil supplied to said fuel supply system.

4,955,944

ROTATING ELECTRIC MACHINE

Hiroaki Aso, and Yutaka Kitamura, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

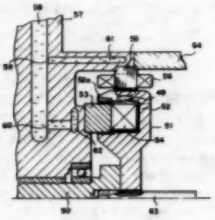
PCT No. PCT/JP88/00125, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06366, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 275,172

Claims priority, application Japan, Feb. 10, 1987, 62-28627; Feb. 12, 1987, 62-30020; Feb. 12, 1987, 62-30021; Feb. 12, 1987, 62-30023; Feb. 12, 1987, 62-30024; Apr. 13, 1987, 62-91218; Apr. 13, 1987, 62-91220; Apr. 15, 1987, 62-93536

Int. Cl.[5] F01P *3/20*; H02K *9/00*

U.S. Cl. 123—41.31 **26 Claims**



1. A rotating electric machine, comprising: revolving-field poles which are driven by an engine and excited by supplying the electric current to field windings; an armature core mounted in an armature winding; field cores mounted in said field windings; and a cylinder block with said armature core and field cores directly mounted thereto, and with a coolant passageway on the armature core side and a coolant passageway on the field core side formed therein for the circulation of a coolant in the coolant circulation system of said engine.

4,955,945

DISPENSER FOR THE VAPORIZATION OF ACTIVE SUBSTANCES TO BE INHALED

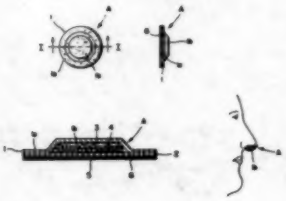
Heinz H. Weick, 94, rue de la Servette, 1202 Geneva, Switzerland

Filed Mar. 22, 1989, Ser. No. 327,128

Claims priority, application Switzerland, Jul. 13, 1988, 02661/88; Sep. 19, 1988, 03483/88; Dec. 21, 1988, 04713/88

Int. Cl.[5] A61M *15/00, 15/02*

U.S. Cl. 128—203.12 **4 Claims**



1. A dispenser for placement near the nostrils for vaporization of active substances of a medical, paramedical, and aromatic-therapeutic nature which are to be inhaled, said dispenser comprising:

a hollow body having two sidewalls for containing an active substance located in a closed chamber,

said hollow body including an absorbent evaporation side wall as one of said two sidewalls to transmit the active substance to the air for respiration as a vapor of the active substance moving along said absorbent evaporation side wall,

said hollow body having a dish made of absorbent air-penetrable paper-like material and forming said absorbent evaporation side wall,

a peripheral edge of said dish being covered by a pasted-on lid forming the other of said two side walls,

said closed chamber being formed between said lid and a raised central portion of said dish located interiorally of said peripheral edge and being filled with micro-capsules containing the active substance, and

said lid being provided on a side opposite to said closed chamber with adhesive layer means for point-like adhesive attachment to the nasal cartilage external of the nasal passages, said adhesive layer means having a smaller surface area than said lid and an entire peripheral area of said lid being free of said adhesive layer means, and

said adhesive layer being protected by a peelable foil.

4,955,946

RESPIRATORY CO_2 DETECTOR CIRCUIT WITH HIGH QUALITY WAVEFORM

Bruce E. Mount, Diamond Bar, and Douglas P. Becker, Walnut, both of Calif., assignors to Marquette Gas Analysis, St. Louis, Mo.

Continuation of Ser. No. 939,992, Dec. 11, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 306,234

Int. Cl.[5] A61B *5/087*

U.S. Cl. 128—719 **7 Claims**

1. A CO_2 detector for monitoring a patient's breath inhalation and exhalation directed through a cuvette, comprising,

an infrared lamp having an input and responsive to a lamp voltage applied thereto,

a circuit including a pulse-width modulator and a lowpass filter connected to said lamp input to provide said lamp input voltage,

an infrared detector,

a preamplifier having an input and an output, said input being connected to said infrared detector,

said lamp being positioned to provide an optical path through a cuvette and impinge on said infrared detector,

said infrared detector and said preamplifier being constructed and arranged so that the output of the infrared detector and preamplifier will produce an electrical waveform representative of the quantity of CO_2 in said cuvette, said waveform having high voltage peaks representing low CO_2 and low voltage valleys representing high CO_2,

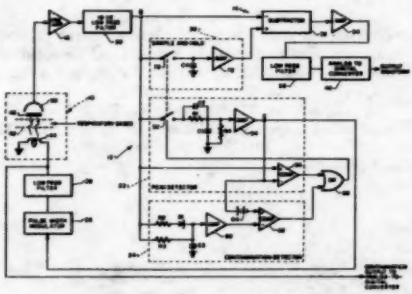
said infrared lamp being constructed and arranged to be responsive to the output of said pulse-width modulator and lowpass filter which causes the preamplifier to have a reference (baseline) DC level,

a peak detector including

a first RC network having an input and an output, said first RC network having a predetermined discharge time constant,

a first switch connected between said preamplifier and said first RC network so that when said first switch is closed the output of said preamplifier will charge said first RC network and when said first switch is open said first RC network will discharge, and

a first comparator having an output connected to operate said switch and having a first input connected directly to the output of said preamplifier and having a second input connected to the output of said first RC network to compare the voltage level at the output of said pre-



amplifier with the voltage level at the output of said RC network so that said first switch will be opened or closed depending upon the compared voltages, wherein the output from said first RC network will apply a voltage so said pulse-width modulator and said lowpass filter to control the lamp input voltage,

a contamination detector including

a second comparator having an output and two inputs,

a second RC network having an input connected to the output of said preamplifier and having an output connected to one input of said second comparator, said second RC network having a discharge time constant shorter than said discharge time constant of said first RC network,

a DC voltage source having a positive terminal and a negative terminal, said negative terminal being connected to a second input of said second comparator and the positive terminal being connected to said second input of said first comparator, the output of said second comparator being connected to operate said first switch to connect the input of said first RC network with the preamplifier output at a preselected value of compared voltages,

whereby said contamination detector will override the peak detector and raise the voltage on the lamp in the event of contamination of the cuvette.

4,955,947

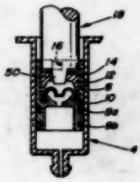
PRESSURE SENSOR

Mohammed A. Hajianpour, Miami, Fla., assignor to Ace Orthopedic Manufacturing, Los Angeles, Calif.

Filed May 14, 1987, Ser. No. 50,506

Int. Cl.[5] A61B 5/00

U.S. Cl. 128—748 **1 Claim**



1. In a tissue pressure measuring system which comprises a syringe having a cylindrical passage and means for connecting a tissue invasion device in fluid communication with the cylindrical passage, a plug in the cylindrical passage having a passage formed therethrough, means sealing the periphery of the plug in fluid tight moveable relationship with the interior of the cylindrical passage, a resilient pressure transmitting diaphragm sealing the passage through the plug and a cylindrical pressure measuring instrument connected to the plug for moving the plug in the cylindrical passage and for sensing pressure transmitted through the diaphragm, the improvement wherein the diaphragm is a membrane formed of inert resilient material fitted inside the interior of the plug, said diaphragm having a substantially flat center portion and an annular portion having a substantially arcuate cross-section around the center point.

4,955,948

PROCESS AND APPARATUS FOR THE CHECKING OF CIGARETTES

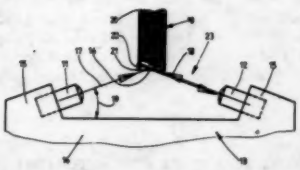
Heinz Focke, and Josef Schulte, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Jun. 29, 1989, Ser. No. 373,840

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822520

Int. Cl.[5] A24C 5/34

U.S. Cl. 131—280 **16 Claims**



1. Process for the checking of cigarettes, in the form of tobacco wrapped in cigarette paper, for correct formation of the cigarettes at their ends by means of electrooptical sensors, which possess transmitters and receivers, and by means for directing test light beams onto at least one end face of the cigarettes and measuring reflecting light, said process being characterized by directing the test light beams (17, 18) onto the end face (16) of a cigarette (10) at an acute angle (19) of less than 45° and in such a way that, when tobacco (20) is missing in a region of the cigarette (10), light is reflected by the cigarette paper (22).

4,955,949

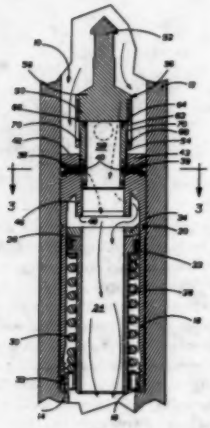
MUD SAVER VALVE WITH INCREASED FLOW CHECK VALVE

Thomas F. Bailey, and Raymond A. Todd, Jr., both of Houston, Tex., assignors to Drilex Systems, Inc., Houston, Tex.

Filed Feb. 1, 1989, Ser. No. 305,319

Int. Cl.[5] F16K *17/40*

U.S. Cl. 137—71 **20 Claims**



1. In a mud saver valve for retaining fluids within a drill string, the mud saver valve including a tubular body adapted to be disposed within the drill string and an axially movable piston having a fluid passageway and disposed within the tubular body, a closure plug mounted within the upper end of the mud saver valve, said closure plug comprising:

a removable spear body seated within the upper end of the mud saver valve, said spear body including a spear sleeve removably seated within the closure plug, a spear head telescopically receiving said spear sleeve, and check valve means;

the piston biased against the downhole flow of fluids to selectively engage said closure plug closing the fluid passageway, said spear head telescopically extending relative to said spear sleeve when fluid pressure downhole of said spear body exceeds a predetermined fluid pressure thereby opening said check valve means allowing fluid exceeding said predetermined fluid pressure to flow upwardly through said closure plug when the fluid passageway is closed, said spear sleeve including an outwardly disposed annular shoulder and said spear head including an inwardly disposed annular shoulder, telescoping extension of said spear head relative said spear sleeve limited by said cooperating shoulders formed on said spear head and said spear sleeve.

4,955,950

FUEL FILL TUBE FOR AUTOMOBILE

Takatsuka Seiichi, and Sato Kyokuichi, both of Soja, Japan, assignors to OM Industrial Co., Ltd., Okayama, Japan

Filed Dec. 8, 1988, Ser. No. 281,551

Claims priority, application Japan, Dec. 9, 1987, 62-188170[U]

Int. Cl.[5] B65D *31/06*

U.S. Cl. 141—46 **1 Claim**

1. A fuel fill tube for automobiles comprising:

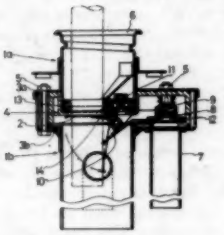
an upper fill tube attached to a fuel cap;

an upper connecting flange provided at a lower end of said upper fill tube;

a lower fill tube attached to a fuel tank;

a lower connecting flange in the form of a bowl-like casing provided at an upper end of said lower fill tube;

a bolt and nut means for assembling said upper connecting flange and said lower connecting flange together, said lower connecting flange and upper connecting flange providing an accommodating space therebetween; and



a vaporized gas recovery unit provided in said accommodating space, said vaporized gas recovery unit comprising a base and a leaded fuel restricting shutter and a vapor discharging or refueling vapor vent valve provided on said base.

4,955,951

BORING APPARATUS

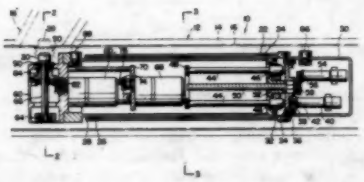
Isao Nemoto, Narashino, and Yuji Yamaoka, Machida, both of Japan, assignors to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo and Nemoto Kikaku Kogyo Kabushiki Kaisha, Yachiyo, both of, Japan

Filed Feb. 27, 1989, Ser. No. 316,298

Claims priority, application Japan, Mar. 1, 1988, 63-45724

Int. Cl.[5] E03F *3/00*

U.S. Cl. 166—55.7 **19 Claims**



1. An apparatus for boring a hole in a first member to which a second member is attached, comprising:

cutting means having a rotary axis extending in the direction intersecting a portion to be bored of said first member and a cutting profile smaller than said hole;

first drive means for displacing said cutting means in the direction of an imaginary first line intersecting said rotary axis;

second drive means for displacing said cutting means in the direction of an imaginary second line intersecting both said rotary axis and said first line;

third drive means for rotating said cutting means about said rotary axis;

detecting means for detecting a load acting on said cutting means and generating an output signal based thereon; and

control means for controlling said first and second drive means on the basis of said output signal of said detecting means for correcting the position of said cutting means relative to a portion to be bored;

wherein at least one of said first, second and third drive

means is provided with a rotary source consisting of an electric motor;

wherein said detecting means detects the load acting on said cutting means on the basis of the power supplied to said electric motor; and

wherein said control means controls, on the basis of said output signal, said first and second drive means so as to displace the position of said cutting means in the directions along said first and second lines to a position where no large load acts on said cutting means.

4,955,952

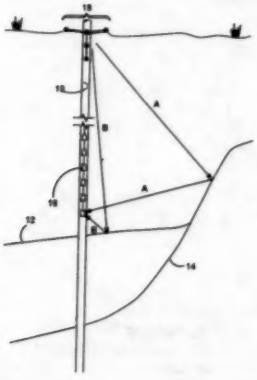
SEISMIC ENERGY SOURCE ARRAY

David E. Williams, Metairie, La., and Michael C. Kelly, Sand Springs, Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 30, 1989, Ser. No. 443,767

Int. Cl.[5] G01V *1/40*

U.S. Cl. 181—111 **8 Claims**



1. A source array useful in vertical seismic profiling, comprising:

a first set of source elements having horizontal extent spaced in at least a first direction and a second, nonparallel direction; and

and a second set of source elements having vertical extent and spaced linearly below the first set of source elements,

wherein the spacing of the source elements in one of the sets is selected to be greater than or approximately ½ the dominant wave length of energy emitted by the source elements in the source array.

4,955,953

LUBRICATING DEVICE

John P. Kayser, Madison, Wis., assignor to KLS International Corporation, Madison, Wis.

Filed Nov. 15, 1988, Ser. No. 271,524

Int. Cl.[5] F16N *13/00*

U.S. Cl. 184—42 **2 Claims**

1. A lubricating device for delivering a shot of lubricant to an area to be lubricated, said lubricating device having a piston assembly that includes a replaceable piston sleeve which can be easily replaced, said lubricating device comprising:

a housing;

a lubricant inlet port formed in said housing;

an air inlet port formed in said housing;

a lubricant outlet port;

a piston assembly disposed in said housing, said piston assembly comprising:

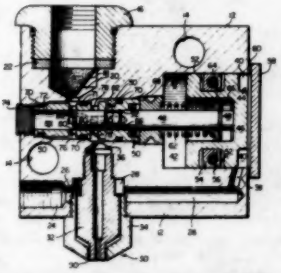
a first piston disposed in a piston chamber in said housing;

a piston sleeve removably disposed in said housing, said piston sleeve having a first outer circumferential groove located approximately adjacent said lubricant inlet port and a second outer circumferential groove located approximately adjacent said outlet port, a first set of circumferentially-spaced transverse bores being formed in said first circumferential groove in said piston sleeve and a second set of circumferentially-spaced transverse bores being formed in said second circumferential groove,

said first set of circumferentially-spaced bores allowing lubricant to pass from said lubricant inlet port to a lubricant holding chamber formed in the interior of said piston sleeve when said piston assembly is in a first, non-actuated position, and

said second set of circumferentially-spaced bores allowing the lubricant in said holding chamber to be forced from said holding chamber to said outlet port when said piston assembly is forced into a second, actuated position;

a second .piston disposed for reciprocating movement within said piston sleeve, said second piston being operatively connected to said first piston whereby said second piston causes a shot of lubricant to be provided to said outlet port upon actuation of said first piston by compressed air from said air inlet port, a portion of the interior of said second piston being hollow, said second piston having an outer circumferential groove and a transverse bore formed in said groove; and



a removable cover for making a fluid-tight seal with said housing whereby upon removal of said cover, said piston assembly can be removed from said housing, said piston sleeve can be replaced with a new piston sleeve, and said piston assembly can be reinserted into said housing with said new piston sleeve,

wherein said housing includes an air passageway in fluid communication with said air inlet, said air passageway joining said piston chamber at a point on the circumference of said piston chamber, said piston chamber including an air chamber so that said first piston may be forced by air pressure from a first, non-actuated position in said piston chamber to a second, actuated position within said piston chamber.

4,955,954

MOTOR-DRIVEN CONTROL APPARATUS

Masayoshi Onishi, and Hiromasa Ozawa, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1989, Ser. No. 374,894

Claims priority, application Japan, Jul. 4, 1988, 63-88941[U]; Jul. 4, 1988, 63-88942[U] Jul. 29, 1988, 63-101286[U]

Int. Cl.[5] F16D *27/00*

U.S. Cl. 192—0.02 R **4 Claims**

1. A motor-driven control apparatus, comprising:

a plurality of stepped gears (6–9) for transmitting the driving

force of a motor (18) to an output gear (10) rotatably mounted on an output shaft (5);

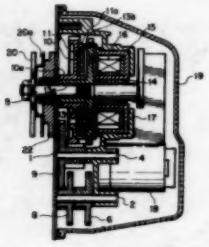
an electromagnetic clutch device including:

a first clutch plate (11) mounted to a side of the output gear through a return spring (12) so that the first clutch plate is urged toward the output gear;

a second clutch plate (13) rigidly secured to the output shaft through a guide sleeve portion (13a) thereof,

a second clutch plate being disposed opposite to the first clutch plate; and

a clutch yoke (15) externally supported by a casing (17), the clutch yoke containing a clutch coil (16), the clutch yoke being disposed such that an axially circumferential surface of a radially outermost portion thereof is axially opposed to a radially outer, axially circumferential surface of the



second clutch plate with an axially extending gap therebetween;

the electromagnetic clutch device being operated such that the first clutch plate is moved away from the second clutch plate by the return spring to idly rotate on the output shaft when the electromagnetic clutch device is off and, when it is on, the first clutch plate is attracted to the second clutch plate to rotatably drive the second clutch plate; and

a rotating lever (20) secured to one end of the output shaft, the rotating lever being adapted to drive an external load drive wire (21);

wherein foreign matter lodged in the axially extending gap between the second clutch plate and the clutch yoke is radially expelled from said gap by centrifugal force during the rotation of the second clutch plate.

4,955,955

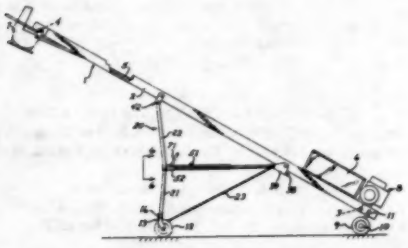
PORTABLE CONVEYOR ASSEMBLY

Joseph R. Driear, Thiensville, Wis., assignor to Robert D. Sawyer, Oak Creek, Wis.

Filed Jun. 5, 1989, Ser. No. 361,495

Int. Cl.[5] B65G *41/00*

U.S. Cl. 198—318 **13 Claims**



1. A portable conveyor assembly, comprising an inclined conveyor having a lower end and an upper end, first wheel means to support the lower end, caster wheel means spaced from said first wheel means and disposed beneath said conveyor, said caster wheel means being mounted for rotation about a vertical axis, an adjustable first linkage connected to said conveyor, a second linkage interconnecting said first linkage and said caster wheel means, and operating means for adjusting the first linkage to thereby vary the elevation of said conveyor, said second linkage being constructed and arranged to automatically maintain said axis in a vertical attitude as said first linkage is adjusted.

4,955,956

TRANSPORT TANK

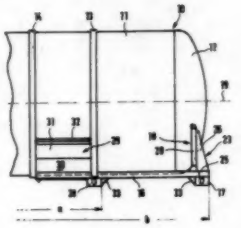
Helmut Gerhard, Weitefeld, Fed. Rep. of Germany, assignor to Westerwaelder Eisenwerk Gerhard GmbH, Fed. Rep. of Germany

Filed Aug. 30, 1989, Ser. No. 400,682

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 8811024

Int. Cl.[5] B65D *7/90*

U.S. Cl. 220—562 **8 Claims**



1. A transport tank including

a cylindrical body defining a longitudinal tank axis, said body having curved end bottoms and a reinforcing ring surrounding said body,

a pair of frame portions each including a lower transverse beam provided with a pair of outer corner fittings, and two lower longitudinal beams extending over part of the tank length, each longitudinal beam being provided with an inner corner fitting and connected to said reinforcing ring,

a pair of end ring elements each formed as a partial ring extending through a range of about 90° to about 180° of the lower half of the end bottom, each end ring element having a radial flange and a flange extending parallel to said tank axis and being welded to a respective end bottom, and

saddle pieces each having a triangular wall portion extending transverse of said tank axis adjacent said tank and substantially tangentially of a respective end bottom, said triangular wall portion being connected to said radial flange of a respective end ring element, and a flange provided at an edge of the wall portion and connected to a respective transverse beam.

4,955,957

PORTABLE COOLER

Hunter Homes, P.O. Box 1, Garoon Valley, Id. 83622

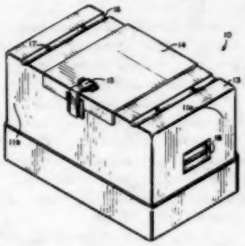
Filed Aug. 14, 1989, Ser. No. 393,627

Int. Cl.[5] B65D *6/00, 43/16*

U.S. Cl. 220—324 **4 Claims**

1. A portable cooler comprising a wall portion, a base and a top, said top having a surface defining an opening into the interior of the cooler to allow the placing of items into and withdrawing of items from the cooler, said opening being centered in and extending substantially the entire width of the top, said surface defining an area extending past said opening,

a pair of spaced grooves in the top, one groove being on each side of the opening, lashing means extending across the top in



said grooves without interfering with said opening so as to allow the securing of the cooler to a surface, and a lid for closing and exposing said opening.

4,955,958

AIRCRAFT

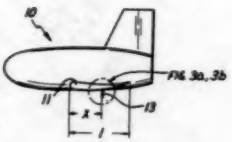
Jürgen Dellinger, Achim, and Ulrich Krämer, Syke-Barrien, both of Fed. Rep. of Germany, assignors to MBB GmbH, Bremen, Fed. Rep. of Germany

Filed Sep. 26, 1988, Ser. No. 249,441

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1987, 3732481

Int. Cl.[5] B64C *3/58, 9/32*

U.S. Cl. 244—213 **5 Claims**



1. Aircraft with no separate elevators in the tail end of the fuselage and having wings, the improvement comprising a single flap means on the respective underside of the wings for extending down to a variable degree and being arranged at a point between 49 and 54% of the local chord depth as measured from the leading edge.

4,955,959

LOCKING MECHANISM FOR A SURGICAL FASTENING APPARATUS

Thomas M. Tompkins, Trumbull, and Dominic F. Presty, Shelton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed May 26, 1989, Ser. No. 358,421

Int. Cl.[5] A61B *17/00*

U.S. Cl. 227—178 **22 Claims**

1. A surgical fastening apparatus including a single use locking mechanism to prevent reactuation of the surgical fastening apparatus, said surgical fastening apparatus comprising:

(a) a frame;

(b) a stationary carrier receivable into said frame;

(c) a pusher assembly slidably mounted within said stationary carrier, said pusher assembly comprising at least one cam bar, a cam bar retainer for mounting the cam bar, said cam bar retainer having a locking notch, a thrust knob attached to the cam bar retainer, and optionally a knife mounted to the cam bar retainer;

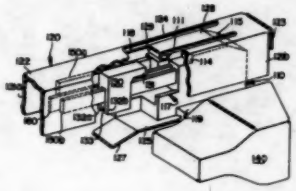
(d) a resilient locking clip fixed to the stationary carrier and having a hook, said locking clip being adapted to be resiliently urged from a first position wherein said hook is non-engagable with said locking notch, to a second position wherein said hook is engagable with said locking notch; and,

(e) a blocking means adapted to be movable from a location wherein said blocking means holds said locking clip in the non-engagable first position, to a location wherein said blocking means does not hold said locking clip in the non-engagable first position.

12. A loading unit for a surgical fastening apparatus, said loading unit comprising:

(a) a stationary carrier;

(b) a pusher assembly slidably mounted within said stationary carrier, said pusher assembly comprising at lest one



cam bar, a cam bar retainer for mounting the cam bar, said cam bar retainer having a locking notch, a thrust knob attached to the cam bar retainer, and optionally a knife mounted to the cam bar retainer;

(c) a resilient locking clip fixed to the stationary carrier and having a hook, said locking clip being adapted to be resiliently urged from a first position wherein said hook is non-engagable with said locking notch, to a second position wherein said hook is engagable with said locking notch; and,

(d) a blocking means adapted to be movable from a location wherein said blocking means holds said locking clip in the non-engagable first position, to a location wherein said blocking means does not hold said locking clip in the non-engageable first position.

4,955,960

APPARATUS FOR COATING WORKPIECES ELECTROSTATICALLY

Hans Behr, Stuttgart; Kurt Vetter, Remseck; Rolf Schneider, Burgstetten, and Fred Luderer, Leutenbach, all of Fed. Rep. of Germany, assignors to Behr Industrieanlagen GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 166,193, Mar. 10, 1988, abandoned. This application Sep. 22, 1989, Ser. No. 411,223

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709508; Jul. 20, 1987, 8709948[U]

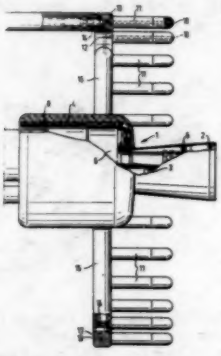
Int. Cl.[5] B05B *5/04*

U.S. Cl. 239—3 **15 Claims**

1. An apparatus for electrostatically coating workpieces with an electrically conductive coating material, said apparatus comprising: a spraying device having an atomizer (1), an internal housing (6) supporting said atomizer (1), said atomizer (1) including a spraying head (2) extending from said internal housing (6); a supply line (3) conducting the coating material from a storage-system to said spraying head (2), said supply line (3) and said spraying head (2) being at ground potential; charging electrodes (10) distributed about said spraying head (2) and connected to a high-voltage supply for charging the coating material and producing an electric field; an electrode-holding arrangement (11, 12, 15) made of an insulating material disposed about said internal housing (6); said apparatus characterized by including potential-control means having a surface interconnecting said internal housing (6) and said charging

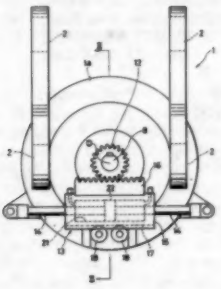
electrodes (10) for approximating the radial-potential pattern continuously over said surface of said potential control means to the radial-potential distribution of the coating material sprayed.

12. A method for electrostatically coating workpieces with an electrically conductive coating material, comprising the steps of: electrically grounding an atomizer (1); discharging the coating material from the atomizer (1) with a predominantly radial component of movement; supporting charging electrodes (10) from the atomizer (1) at a radially outward spacing;



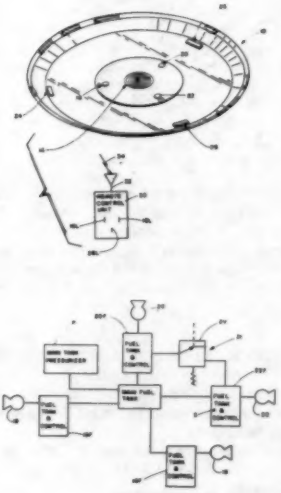
electrically charging the coating material sprayed from the atomizer (1) by corona discharge to form a radial potential electrical charge distribution in the coating material having the highest electrical potential proximate the electrodes (10) and the lowest electrical potential proximate the grounded atomizer (1); and characterized by including the step of approximating the radial potential pattern over a continuous surface interconnecting the atomizer (1) and the electrodes (10) to the radial potential electrical charge distribution in the coating material sprayed.

4,955,961
WORKING MACHINE
Itsuo Tagawa, Tokyo, Japan, assignor to Tagawakougyou Co. Ltd., Tokyo, Japan
Filed Jun. 22, 1989, Ser. No. 369,967
Int. Cl.[5] B02C *1/02*
U.S. Cl. 241—264 **5 Claims**



1. A working machine, comprising:
a machine body;
a pair of arms mounted on said machine body for relative movement toward and away from each other in a plane that is variably oriented;
a bracket mounted on said machine body, said machine body being arranged for rotation relative to said bracket about as axis;
a hydraulic cylinder assembly having a single cylinder defining therein a hydraulic chamber, and a piston rod unit comprising a piston rod extending through said hydraulic chamber and a single piston fixedly mounted to said piston rod so as to divide the hydraulic chamber into a pair of chamber sections, said piston rod having opposite ends thereof which extend respectively from opposite ends of said hydraulic chamber, said opposite ends of said piston rod being fixedly connected to said bracket;
a rack fixedly mounted to said cylinder of said hydraulic cylinder assembly; and
a pinion mounted on said machine body and in mesh with said rack for rotation relative thereto about said axis,
whereby said cylinder of said hydraulic cylinder assembly and said rack are moved relatively to said bracket in a direction perpendicular to said axis upon introduction of hydraulic fluid into said hydraulic chamber, so that said pinion and said machine body are rotated about said axis with the movement of said rack.

4,955,962
REMOTE CONTROLLED FLYING SAUCER
Christian Mell, 211 South St., Port Jefferson, N.Y. 11777
Filed Feb. 2, 1989, Ser. No. 305,119
Int. Cl.[5] B64C *29/00*
U.S. Cl. 244—23 C **4 Claims**



1. A remotely controlled flying saucer comprising:
(A) a circular body having a top surface and a bottom surface;
(B) a propulsion system which includes
(1) a plurality of jet motors on said bottom surface,
(2) a plurality of individual fuel tanks mounted on said body,
(3) individual conduit means connecting each individual fuel tank of said plurality of fuel tanks to an individual jet motor of said plurality of jet motors,

(4) a main fuel tank mounted on said circular body,
(5) individual fuel tank control means connected to each individual fuel tank,
(6) main fuel tank conduit means fluidically connecting each individual fuel tank control means to said main fuel tank to fluidically connect each individual jet motor to said main fuel tank,
(7) a valve connected to the control means of each individual tank to be operated to conduct fuel from said main fuel tank to said each individual tank when the control means associated with such each individual tank is activated,
(8) individual fuel tank fluidic connection means connecting each individual fuel tank to another individual fuel tank and including
(a) a normally closed diverter valve which establishes fluid communication between said each individual fuel tank and said another tank when said diverter valve is opened,
(b) a fuel level sensor in each individual fuel tank which senses fuel level in said each individual fuel tank and generates a signal when said fuel level is below a predetermined level, and
(c) control means for opening said diverter valve upon receiving a signal from said fuel level sensor;

(C) a plurality of direction controlling guide flaps on said bottom surface;
(D) motor control means on said body and connected to each jet motor for operating said each motor independently of all other jet motors;
(E) guide flap control means on said body and connected to each guide flap for operating said each guide flap independently of all other guide flaps;
(F) a signal receiving means connected to said guide flap control means, to said individual fuel tank control means, and to said motor control means for receiving over-the-air motor control signals and for receiving over-the-air flap control signals and for receiving over-the-air individual fuel tank control unit operating signals and operating said motors, said individual fuel tank control units and said flaps in response to receipt of such over-the-air signals; and
(G) main control means which is adapted to be located remotely of said body and which includes motor control signal transmitting means which transmits motor control signals over-the-air to said signal receiving means, guide flap control signal transmitting means which transmits guide flap control signals over-the-air to said signal receiving means, and individual fuel tank control means signal generating means which transmits individual fuel tank control signals over-the-air to said individual fuel tank control means.

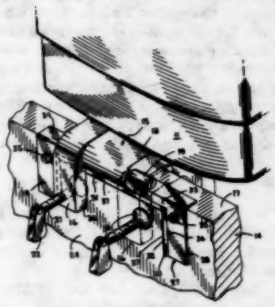
4,955,963

OUTBOARD MOTOR RETAINER

Richard H. Snyder, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 29, 1989, Ser. No. 458,581
Int. Cl.[5] B63B *17/00*
U.S. Cl. 248—640 **8 Claims**

1. A retainer assembly for a transom-mounted outboard boat motor comprising, in combination:
a boat transom;
a motor transom bracket attached to the upper edge of the transom and having transom-engaging clamping members including a pair of laterally spaced thumb screws threadably attached to the transom bracket, each screw having a clamping pad on one end including a clamping face adapted to engage the transom, said clamping pads being adjustable between a normally clamped position in engagement with the transom and a fully open unclamped position disengaged from the transom;
a retaining lip attached to the transom and substantially completely surrounding the upper and lateral regions of normal engagement between the clamping pads and the transom;
said retaining lip having a free edge spaced from the face of the transom by an amount greater than the maximum distance between said transom face and the clamping faces of said pads in the fully open unclamped position;



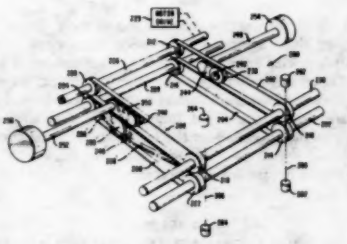
a mounting notch in said retaining lip adjacent the upper edge of the transom, said notch defining a recessed edge portion spaced from the face of the transom by an amount less than said maximum distance; and,
said recessed edge portion having a length greater than the maximum dimension of the face of said clamping pad.

4,955,964

SHEET HANDLING APPARATUS

David A. Hain, Dundee, Scotland, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 12, 1988, Ser. No. 282,722
Claims priority, application United Kingdom, Aug. 19, 1988, 8819768
Int. Cl.[5] B65H *3/00*
U.S. Cl. 271—225 **5 Claims**



1. A sheet moving apparatus comprising:
first and second belt means for moving a sheet along a path of movement from a first point to a second point in said apparatus;
said first belt means including first and second belts, and said second belt means including first and second belts;
said first belts of said first and second belt means having cooperating portions to enable said sheet to be moved therebetween;
said second belts of said first and second belt means having cooperating portions to enable said sheet to be moved therebetween;
sensing means to detect the leading edge of said sheet entering said apparatus and to provide an output indicative of

the orientation of said leading edge relative to said path of movement in said apparatus;

said first and second belts of said first and second belt means being endless belts made of resilient stretchable material;

first actuating means for stretching said cooperating portions of said first belts of said first and second belt means so as to change the lengths thereof; and

second actuating means for stretching said cooperating portions of said second belts of said first and second belt means so as to change the lengths thereof; and

control means for controlling the operation of said first and second actuating means so as to stretch, when necessary, said cooperating portions of said first and second belts of said first and second belt means in response to said output of said sensing means so as to align the leading edge of said sheet perpendicular to said path of movement as said sheet is moved from said first point to said second point.

4,955,965

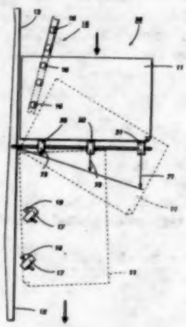
POSITIVE DRIVE, PASSIVE, SHEET ROTATION DEVICE USING DIFFERENTIAL ROLL VELOCITIES

Barry P. Mandel, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1988, Ser. No. 280,078

Int. Cl.[5] B65H *5/06*

U.S. Cl. 271—225 **11 Claims**



1. A sheet turning mechanism for turning sheets 90° and registering them against a registration member is adapted for use with a folder apparatus and characterized by at least two pairs of crowned roller nips constantly rotating at their respective speeds, and wherein said at least two crowned roller nip pairs are driven such that their surface velocities create a rotation of the sheets about the lead corner of the sheets adjacent to said registration member and completes a 90° rotation of the sheets before leaving said nips.

4,955,966

RUBBER COMPOSITION AND GOLF BALL COMPRISING IT

Syoji Yuki, Osaka; Yasuyuki Tokui, Takatsuki; Kihachiro Nishiuchi, Tokushima; Kenichi Wada, Itano; Masayoshi Suzue, Tokushima, and Takuo Morimoto, Kyoto, all of Japan, assignors to Asics Corporation, Kobe and Otsuka Chemical Co., Ltd., Osaka, both of, Japan

Filed Jun. 9, 1988, Ser. No. 204,310

Claims priority, application Japan, Jun. 11, 1987, 62-146019; Jun. 12, 1987, 62-147218; Jun. 12, 1987, 62-147219; Jun. 12, 1987, 62-147220; Jun. 12, 1987, 62-147221

Int. Cl.[5] A63D *37/06;* **A63B** *37/12*

U.S. Cl. 273—218 **12 Claims**

1. A golf ball comprising a rubber composition comprising 100 weight parts of at least one natural and/or synthetic rubber component(s), 10 to 50 weight parts of fine inorganic fibers having an aspect ratio of 5 to 1000 and 0.1 to 15 weight parts of a non-sulfur type vulcanizing agent, the fine inorganic fibers being treated with a surface treating agent prior to mixing with said rubber component(s), said surface treating agent being selected from the group consisting of compounds represented by the formula I;

$$(HS-R^1\frac{\ }{\ })_a Si-R^2_b \quad \text{with } X_{4-a-b} \text{ on Si} \tag{I}$$

wherein each R^1 independently represents a substituted or unsubstituted divalent hydrocarbon group of 2 to 6 carbon atoms, each R^2 independently represents a substituted or unsubstituted monovalent hydrocarbon group, each X independently represents a hydrolyzable group, a is an integer of from 1 to 3, and b is an integer of from 0 to 2 with the proviso that $1 \leqq (a+b) \leqq 3$; and compounds represented by the formula II;

$$R^3_c-\underset{Y_{3-c}}{\underset{|}{Si}}-R^4-(S)_n-R^4-\underset{Y_{3-c}}{\underset{|}{Si}}-R^3_c \tag{II}$$

wherein each R^3 independently represents a substituted or unsubstituted monovalent hydrocarbon group, each R^4 independently represents a substituted or unsubstituted hydrocarbon group of 2 to 4 carbon atoms, each Y independently represents a hydrolyzable group, c is an integer of from 0 to 2 and n is an integer of from 1 to 6.

4,955,967

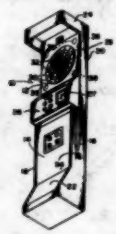
ELECTRONICALLY SCORED DART GAME WITH MISSED DART DETECTION SYSTEM

John W. Houriet, Jr., Bensalem, and James A. Kavanagh, Warminster, both of Pa., assignors to Merit Industries, Inc., Bensalem, Pa.

Filed Jan. 16, 1990, Ser. No. 465,280

Int. Cl.[5] F41J *5/06*

U.S. Cl. 273—372 **10 Claims**



6. In an electronically scored dart game having a housing, including a front surface, a target on the housing front surface, the target including means for receiving the tip of a dart, and electronic means for sensing the receipt of a dart tip by the target and for generating a score signal to determine a score in response thereto, the electronic means including display means for displaying a score, the improvement comprising:

detection means for detecting when a dart strikes the housing in the vicinity of the target, (a missed dart), the detection means comprising:

(a) first audio sensor means located proximate the target for detecting sounds created when a dart strikes either the target or the housing in the vicinity of the target and for generating an electrical signal upon the detection of such sounds,

(b) second audio sensor means located remote from the target for detecting sounds that simulate the sounds

created when a dart strikes either the target or the housing in the vicinity of the target and for generating an electrical signal upon the detection of such simulated sounds; and

(c) first comparison means communicating with the first and second audio sensor means for generating an electrical output signal indicative of a dart striking the target or the housing in the vicinity of the target only when an electrical signal is received from the first audio sensor means in the absence of an electrical signal from the second audio sensor means.

4,955,968

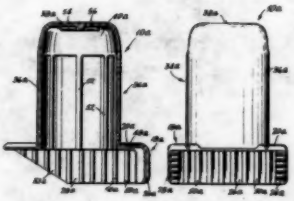
PROTECTIVE COVER FOR A TRAILER HITCH

Frank S. Beckerer, Jr., 40 Dock Rd., Milford, Conn. 06460

Filed Oct. 17, 1988, Ser. No. 258,648

Int. Cl.[5] B60R *21/34*; B65D *65/02*

U.S. Cl. 280—507 **11 Claims**



1. A safety cover for a trailer hitch having a hitch bar with a hitch bar surface, comprising in combination:

(a) a one-piece molded, resilient box-like base portion having a horizontal top wall and depending side walls adapted to overlie the surface of the hitch bar, and having between its side walls a cavity which is open at the bottom and which has a side opening that extends substantially to said top wall, in which cavity the hitch bar can be received, and

(b) a plurality of inwardly projecting spaced-apart fins molded integral with and extending from the inner surface of at least one wall, thereby to maintain a clearance space between the said one wall and the adjacent surface of the hitch bar.

4,955,969

FREE TECHNIQUE SKI POLE

Rainer Jansson, Salem, Mass., and Aimo Pirttiaho, Helsinki, Finland, assignors to Exel Oy, Helsinki, Finland

Continuation of Ser. No. 120,951, Nov. 16, 1987, abandoned. This application May 1, 1989, Ser. No. 345,564

Claims priority, application Finland, Nov. 18, 1986, 874681

Int. Cl.[5] A63C *11/24*

U.S. Cl. 280—824 **11 Claims**

1. A free technique ski pole stick and a plastic snow disk, a sleeve integral with said snow disk having an opening to receive said pole stick and secure the disk to the stick, said snow disk being asymmetrical in a fore and aft direction about said sleeve with said sleeve being at the forward edge of the disk as the disk and pole would be moved when in use, the lower end of said sleeve extending below the pole stick opening and forming a pin mounting hub, a pin mounted to said hub and projecting downwardly therefrom, said pin at the end of said hub being substantially centered about the central axis of said pole stick, the axis of the portion of the pin projecting beyond the hub being inclined at an angle toward one side of the disk with respect to the axis of the pole stick said one side being that which would be adjacent the user of the pole and the lower edges of said snow disk which extend laterally and rearward from the opposite lateral sides of said sleeve being in a plane

laterally inclined to the axis of the pole so that they are substantially normal to the axis of the projecting portion of said pin.

4,955,970

METHOD OF FORMING A JOINT BETWEEN A CONNECTING PIECE AND A PRODUCT FORMED OF COMPOSITE MATERIAL, SAID JOINT, AND SAID CONNECTING PIECE FOR FORMING SAID JOINT

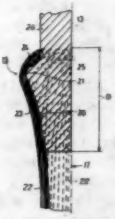
Ilkka Kivi, Helsinki; Tapio Manner, Vantaa; Kari Kuvaja, and Jorma Teräväl, both of Tampere, all of Finland, assignors to Exel Oy and Rauma-Repola Oy, both of, Finland

Filed Oct. 13, 1988, Ser. No. 257,435

Claims priority, application Finland, Oct. 16, 1987, 874576

Int. Cl.[5] F16L *39/00*

U.S. Cl. 285—149 **8 Claims**



1. A method of forming a joint between a connecting piece and a product formed of composite material including a binding material matrix and reinforcing fibers extending through the matrix in a longitudinal direction, comprising the steps of:

forming said connecting piece with a shoulder within a joint region thereof,

placing said connecting piece in a location at which said product is being formed,

forming said product, and during formation of said product, guiding said longitudinally extending reinforcing fibers of said composite material as continuous, unitary fibers in a first direction in a first path within said joint region of said connecting piece towards said shoulder thereof, to turn around said shoulder of said connecting piece, and then in a second direction substantially opposite to said first direction in a second path within said joint region of said connecting piece to return to said composite material of said product,

guiding at least some of said reinforcing fibers so that each crosses over itself at least once in said joint region, which includes said shoulder, of said connecting piece,

whereby said joint formed between said connecting piece and said product comprises a self-tightening joint, and

whereby both said product of said composite material and said joint between said product and said connecting piece are formed simultaneously.

4,955,971

MULTI-PURPOSE TOOL UTILIZING ARMS WITH PARALLELOGRAM COUPLING AT PROXIMAL ENDS

Victor H. Goulter, 485 Molimo Dr., San Francisco, Calif. 94127

Filed Apr. 10, 1989, Ser. No. 335,738

Int. Cl.[5] A47J *43/28*

U.S. Cl. 294—7 **11 Claims**

1. A multi-purpose tool, comprising:

first and second elongated arms, each arm having a proximal end and a distal end at the end opposite said proximal end, each arm comprising first and second portions, said first portion being at said proximal end and said second portion comprising the rest of each arm, including said distal end thereof, said first portion being shorter than said second portion;

said distal end of each arm having a working implement thereat;

joinder means for joining said proximal ends of said arms together, said joinder means comprising first and second crossarms, each crossarm comprising a member having first and second ends;

said first ends of said crossarms being hingedly attached to said first arm at spaced locations thereon, said locations defining said first portion of said first arm, said second ends of said crossarms being hingedly attached to said second arm at spaced locations thereon, said locations defining said first portion of said second arm, said second locations corresponding, respectively, to the locations on said first arm where said first ends of said crossarms are attached, such that said crossarms and said first portions of said arms intermediate said locations where said ends of said crossarms are attached form an adjustable parallelogram at said proximal ends of said arms;

said second portions of said arms extending away from said paralleogram;

each arm being hingedly joined to each of said crossmembers at locations on each arm which are offset from each arm;

whereby said arms can be moved to and held in any one of the following three working relationships:

(a) said arms are adjacent and parallel to each other with said distal end of one arm projecting forward of said distal end of the other arm so that said working implement at said distal end of one arm can be used alone,

(b) said arms are adjacent and parallel to each other with said distal end of said other arm projecting forward of said distal end of said one arm so that said working implement at said distal end of other arm can be used alone, and

(c) said arms are spaced from and parallel to each other with said distal end of one arm opposite said distal end of said other arm so that when said arms are grasped between said ends thereof and squeezed together, said working implements at said distal ends of said arms will be brought together so that said working implements can be used together.

4,955,972

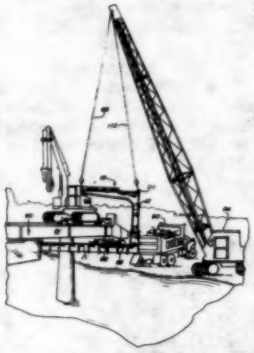
CATCH BASIN FOR BRIDGE DECK DEMOLITION

Roy E. LaBounty, HC2, Box 105E, Two Harbors, Minn. 55616

Filed Nov. 14, 1988, Ser. No. 270,213

Int. Cl.[5] B65D *19/02*; B66C *1/26*

U.S. Cl. 294—68.26 **1 Claim**



1. An attachment for collecting broken pieces of concrete and the like for connection to a winch system of a mobile machine such as a crane and utilized in an operation such as a bridge deck demolition, comprising

a tray-like container for collecting falling debris such as crushed concrete and broken reinforcing bars and having a closed end and an open end, the tray-like container having an elongate portion for extending transversely across the span of a structure such as a bridge, the tray-like container including a lateral rib for bracing the elongate portion,

a support means for supporting the tray-like container and having an upright leg and a support arm, the upright leg mounted on the closed end of the tray-like container and being hinged so that the support means may be compacted for transportation and storage, the support arm affixed to an upper portion of the upright leg and extending inwardly over the tray-like container, the length of the support arm being approximately one-half the length of the tray-like container,

a suspending cable connected to an inner portion of the support arm for suspending the tray-like container below a structure such as a bridge deck for the collection of falling debris, the inner portion of the support arm defining a center of balance of the support means and tray-like container, and

a tilting cable connected to the closed end of the tray-like container, the tilting cable raising the closed end relative to the open end of the tray-like container so that the container is tilted and debris collected therein slides off the open end and into a vehicle such as a dump truck.

4,955,973

CONVERTIBLE BENCH SEAT FOR VANS

Roland L. Provencher, 4406 SW. 66th Terr., Davie, Fla. 33314

Filed Apr. 20, 1989, Ser. No. 340,897

Int. Cl.[5] B60N *2/14, 2/30*

U.S. Cl. 296—65.1 **13 Claims**

1. A foldable seat for a vehicle having an essentially vertical wall and an essentially horizontal floor and constructed and arranged for pivoting said foldable seat about a first vertical

axis between a seat storage position against said wall and a seat operative position pivoted away from said wall comprising:

one longitudinal end portion of said seat,

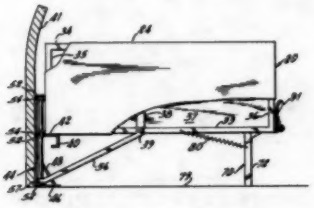
an opposite longitudinal end portion of said seat,

a back portion for said foldable seat,

a seat portion for said foldable seat pivotally connected to said back portion about an essentially horizontal axis for movement between a seat portion storage position against said back portion and a seat portion operative position unfolded from said back portion,

a first vertical pivot rod adjacent said essentially vertical wall and constructed and arranged for pivotally supporting said one longitudinal end portion of said foldable seat for movement of said foldable seat about said first vertical axis,

a second vertical pivot rod adjacent said essentially vertical wall in spaced relation to said first vertical pivot rod, and



a locking mechanism pivotally secured to said second vertical pivot rod and constructed and arranged for selectively securing said foldable seat to said wall and for selectively releasing the opposite longitudinal end portion of said foldable seat to pivot away from said wall about said first vertical pivot rod, further including

a pivotable support frame pivotably supported at one end thereof to said foldable seat, and

means operatively connected between said pivotable support frame and said seat portion and constructed and arranged to lower said pivotable support frame to engage the floor of said vehicle when said seat portion moves to said unfolded seat portion operative position and to lift said pivotable support frame into engagement with said seat portion when the latter moves into said folded seat portion storage position.

4,955,974

APPARATUS FOR GENERATING X-RAY HOLOGRAMS AND METHOD FOR OBJECT RECONSTRUCTION

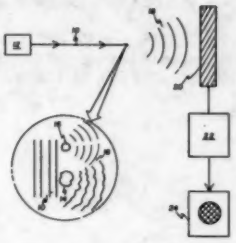
Charles K. Rhodes, Chicago, Ill.; Keith Boyer; Johndale C. Solem, both of Los Alamos, N. Mex., and Waleed S. Haddad, Chicago, Ill., assignors to MCR Technology Corporation, Chicago, Ill.

Continuation of Ser. No. 234,328, Aug. 18, 1988, abandoned. This application Jan. 18, 1990, Ser. No. 470,991

Int. Cl.[5] G03H *1/10*

U.S. Cl. 350—3.67 **14 Claims**

1. An apparatus for generating a hologram of a sample in the x-ray region of the electromagnetic spectrum, said apparatus comprising in combination: a spherical reference scatterer located in the vicinity of the sample under investigation, means for generating substantially monochromatic and substantially coherent x-radiation having sufficient size to simultaneously illuminate the sample and said spherical reference scatterer, means for detecting and recording spatial frequencies in the forward direction relative to the incident x-radiation resulting from the interference of x-radiation scattered by the sample



and by said spherical reference scatterer, and means for reconstructing the image of the sample.

4,955,975

RAINBOW FORMING DEVICE

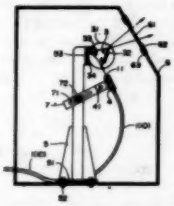
Kei Mori, 3-16-3-501, Kaminoge, Setagaya, Tokyo, Japan

Filed Jul. 24, 1989, Ser. No. 384,356

Claims priority, application Japan, Sep. 26, 1988, 63-239954; Mar. 29, 1989, 1-77343

Int. Cl.[5] G02B *6/34*

U.S. Cl. 350—96.19 **18 Claims**

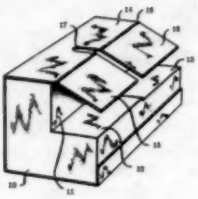


16. An artificial rainbow forming device comprising an enclosure housing, an upright stand in said housing, a first and second mounting means on said upright stand, an elongated light guide means extending into said housing and having a longitudinal end portion terminating at a light emitting end, said longitudinal end portion of said light guide means having a longitudinal axis, said first mounting means mounting said longitudinal end portion of said light guide means on said upright stand such that the position of said longitudinal end portion of said light guide means is adjustable relative to said upright stand, an elongated prism disposed in said housing, said second mounting means mounting said prism on said upright stand, said elongated prism having a cross section in the form of a substantially equilateral triangle, said prism having first, second and third vertexes at each of first, second and third edges, said first mounting means mounting said longitudinal end portion of said light guide means such that said longitudinal end portion of said light guide means is juxtaposed to said first prism edge and said longitudinal axis of said longitudinal end portion of said light guide means is substantially perpendicular to said first prism edge, said light-emitting end of said light guide means emitting visible light rays to said prism to pass through said prism along a path from said first prism vertex to said second prism vertex and the light rays are split into colors of the spectrum which are emitted from said third prism vertex, a cover means on said housing, said cover means having a transparent part, said light rays emitted from said third prism vertex passing through said transparent part to form an artificial rainbow externally of said housing.

4,955,976
OPTICAL FIBER CONNECTOR

Lucius J. Freeman, Hartwell, and Paul F. Gagen, Duluth, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 232,516, Aug. 15, 1988, Pat. No. 4,856,866, which is a continuation of Ser. No. 912,021, Sep. 29, 1986, abandoned. This application Jun. 14, 1989, Ser. No. 335,318
Int. Cl.[5] G02B *6/38*
U.S. Cl. 350—96.21 **5 Claims**



1. An optical fiber connector comprising

(a) a first and a second cylindrical plug, the first and second plug each having an outer diameter, an axis, a cylinder surface, an end face and a longitudinal bore adapted for receiving therein a portion of the first and second optical fiber, respectively, the fiber to be fixed in the respective bore, the bore having an axis that is essentially coincident with the axis of the respective plug;

(b) alignment means for maintaining the first and second plugs aligned such that the axis of the first plug is substantially collinear with the axis of the second plug, with opposed plug end faces, the alignment means contacting the first and second plug cylinder surfaces and comprising spring clip means having two (not necessarily identical) halves, wherein

(i) the alignment means comprise an alignment block having two arms and being of basically L-shaped cross section and adapted for receiving the plugs in the space defined by the arms; and

(ii) the spring clip means are adapted for urging the first and second plugs into the space defined by the two arms of the alignment block, and at least partially circumferentially surround at least a portion of the alignment block and extend over at least a part of the space defined by the two arms of the alignment block, and furthermore comprise a transverse slit that defines the two halves, with one half of the spring clip to urge the first plug and the other half to urge the second plug.

4,955,977
NONLINEAR OPTICAL ARTICLE WITH IMPROVED BUFFER LAYER

Phat T. Dao; Michael Scozzafava; Jay S. Schildkraut, and Christopher B. Rider, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 11, 1989, Ser. No. 419,819
Int. Cl.[5] G02B *6/00*; H03F *7/00*; B32B *9/04*; F21V *9/14*
U.S. Cl. 350—96.34 **16 Claims**

1. An optical article for the propagation of electromagnetic radiation comprised of

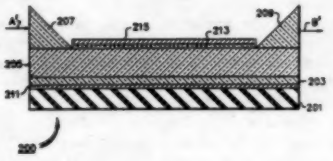
an electrically conductive support,

a poled polymeric film located on said support exhibiting a glass transition temperature of at least 50° C. and a second order polarization susceptibility greater than 10^{-9} electrostatic units, and

a transmission enhancement layer interposed between said conductive support and said polymeric film,

characterized in that

said transmission enhancement layer is an amorphous layer of at least 0.5 μm in thickness having a refractive index less than that of said polymeric film and a resistance less than 10 times that of said polymeric film, said

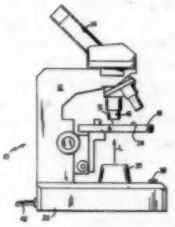


transmission enhancement layer being comprised of a mixture of (a) at least one metal oxide or fluoride and (b) a low molecular weight aromatic compound.

4,955,978
MICROSCOPE BASE ILLUMINATOR

George Hayashi, San Jose, Calif., assignor to Swift Instruments, Inc., San Jose, Calif.

Filed May 17, 1989, Ser. No. 352,929
Int. Cl.[5] G02B *21/06*
U.S. Cl. 350—523 **12 Claims**



1. A microscope illuminator base for use with a microscope comprising a microscope body, a specimen viewing platform and an eyepiece and viewing optics defining a microscope viewing axis through said eyepiece and viewing optics for visual inspection of a microscope specimen disposed upon said platforms,

said microscope illuminator base disposed beneath said platform, relative to said viewing optics, for generation of light for illumination of a microscope specimen disposed upon said platform, said microscope illuminator base comprising a fluorescent lamp means for generation of illuminating light on said viewing axis, said fluorescent lamp means comprising at least two fluorescent lamp arms, each said lamp arm comprising a glass wall having an inner surface, with an active illuminating volume defined within said glass wall by said inner surface, said lamp arms disposed with the respective inner surfaces of said glass walls defining said active illuminating volumes disposed on opposite sides of and generally tangent to said microscope viewing axis, and a line intersecting said viewing axis and the axes of said lamp arms lying at an acute angle to said viewing axis.

4,955,979

OPTICAL PYROMETER WITH AT LEAST ONE FIBRE

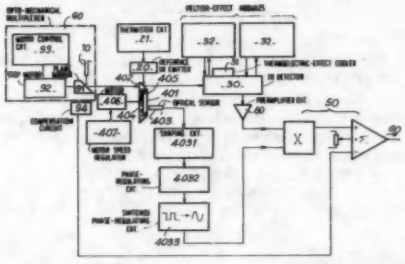
Yves Denayrolles, Le Vesinet, and Robert E. Pillon, Le Havre, both of France, assignors to Electricite De France - Service National, Paris, France

Filed May 31, 1989, Ser. No. 359,303

Claims priority, application France, Jun. 1, 1988, 88 07308

Int. Cl.[5] G01J *5/26, 5/54*

U.S. Cl. 374—131 **7 Claims**



1. An optical pyrometer for measuring the temperature of a target object (C) having a temperature not greater than about 500° C. and producing IR radiations, said pyrometer comprising: at least one optical fiber (10) transparent to IR, made of fluoride glass and having an entrance end, directed toward said target object (C) and positioned to receive at least a part of the IR radiation flux produced by said target object (C), and an exit end through which said part of the IR radiation flux received by said entrance and emerges: a reference emitter (20) for emitting a reference IR flux and which is located near said optical fiber exit end;

an infra-red detector (30), sensitive to impinging IR fluxes emerging from said optical fiber exit end and emitted by said reference emitter (20), and adapted to receive said fluxes and to produce an output signal commensurate with the impinging fluxes;

a mechanical modulator (40) positioned, in the direction of propagation of said fluxes from said optical fiber exit end and from said reference emitter, upstream of said detector, and adapted to periodically and successively interrupt the IR flux, emerging from said optical fiber exit end, and the IR flux originating from said reference emitter (20), and to produce a servocontrol signal;

electronic means (50), connected to both said detector (30) and said mechanical modulator (40), to receive their respective output and servocontrol signals to ensure a synchronous detection; and

a measuring apparatus (60), connected to said electronic means (50), for indicating the temperature of the target object (C) irradiating the optical fiber entrance end.

4,955,980

THERMOMETER PROBE

Yoshihisa Masuo, Shiga, Japan, assignor to Omron Corporation, Kyoto, Japan

Continuation of Ser. No. 210,169, Jun. 21, 1988, abandoned, which is a continuation of Ser. No. 914,254, Oct. 2, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 327,389

Claims priority, application Japan, Oct. 2, 1985, 60-149964[U]

Int. Cl.[5] G01K *7/16, 1/08*

U.S. Cl. 374—185 **4 Claims**

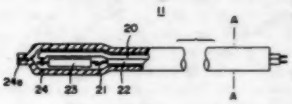
1. A thermometer probe for sensing the temperature of a liquid, comprising:

a temperature sensing element for sensing the temperature of said liquid;

first and second elongated conductive members connected on opposing sides of the temperature sensing element for communicating temperature information, wherein the first conductive member is shorter than the second conductive member, and wherein the first conductive member and the temperature sensing element when joined together form substantially the same length as the second conductive member;

first and second insulating members for coating the first and second conductive members, respectively; and

an elongated water-resistant elastic sheath enclosing the



temperature sensing element, the first and second conductive members, and the first and second insulating members, wherein the water-resistant elastic sheath has a distal end which is welded closed, wherein the water-resistant elastic sheath extends continuously from said distal end a distance substantially equal to the length of the elongated conductive members to at least a point remote from the temperature sensing element where no exposure to said liquid occurs, and wherein the water-resistant elastic sheath directly abuts the insulating members.

4,955,981

RECLOSABLE BAG HAVING HOOK AND LOOP SEALING STRIPS

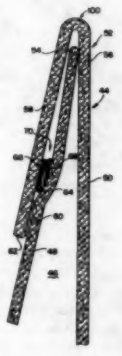
George A. Provost, Litchfield, N.H., assignor to Velcro Industries B.V., Amsterdam, Netherlands

Continuation of Ser. No. 38,424, Apr. 10, 1987, abandoned, which is a continuation of Ser. No. 790,966, Oct. 24, 1985, abandoned. This application Apr. 1, 1988, Ser. No. 178,841

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[5] B65D *33/24;* **A44B** *18/00*

U.S. Cl. 383—86 **7 Claims**



1. In a bag of flexible, frangible material including a bottom, opposed spaced sides, and opposed spaced front and rear pieces terminating at the top in front and rear edges respectively, the improvement to provide tamperproof resealability comprising:

(a) a flap of the flexible, frangible material extending from the rear edge and descending from a fold-point downward over the front edge and down along the front piece;

(b) a strip of adhesive disposed along the bottom edge of said flap to secure it to the front piece;

(c) first and second elongated strips of a hook and loop fastening system disposed between said flap and front piece above and adjacent to said strip of adhesive with said first strip adhesively attached across the full width thereof to said flap and said second strip adhesively attached across the full width thereof to the front piece, one of said first and second strips including an engaging area along its upper longitudinal edge portion which is sufficiently narrower than the width of the engaging area of the other of said first and second strips, the remaining area along the lower longitudinal edge of the one strip lacking the ability for that strip to form an attachment to the adjacent area of the other strip;

wherein said fold-point of said flap provides a means of placing said strips in substantial alignment with one another along their longitudinal edges so that one strip substantially overlies the other strip; and

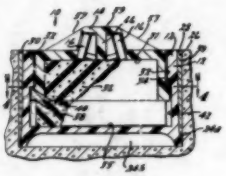
(d) fracturing means disposed for fracturing and splitting said flap adjacent the bottom edge of said first and second strips whereby upon initial opening of said fracturing means said flap is fractured and separated along a line closely adjacent said lower edge of said strips and thereafter when said first strip engages and substantially overlies said second strip with said longitudinal edges substantially aligned, said flap and a sufficient portion adjacent the lower longitudinal edge of said first strip can be laterally rolled back away from said second strip, to be directly gripped by human fingers to laterally pull said first strip out of attachment with said second strip whereby the initial lateral separation forces of both strips are intermediate the longitudinal edges of the strips substantially along the boundary of said engaging area and said remaining area so that peeling of said lower longitudinal edges of the strips from said flap and said front piece is prevented thereby avoiding delamination of either strip from the member of the bag to which it is adhesively attached.

4,955,982

RAISED DEPRESSIBLE PAVEMENT MARKER

Harry D. Paulos, Columbus, Ohio, assignor to Olympic Machines, Inc., Columbus, Ohio

Filed Mar. 26, 1987, Ser. No. 30,089
Int. Cl.[5] E01F *9/06*
U.S. Cl. 404—11 **29 Claims**



1. A depressible, reflective, pavement marker comprising:

a base receptacle adapted to be fixedly secured to the walls of a cavity formed within a pavement, said base receptacle having an upper end portion adapted to be positioned at or below the upper surface of said pavement whereby snow removal equipment may move thereacross without damaging said receptacle;

a piston assembly freely movable within said base and including a reflector, portions of said piston assembly normally protruding above the base and the pavement surface, said portions being depressible downwardly into said base;

said piston assembly including metal wear members associated with said protruding portions of said piston operative to resist abrasive wear resulting from foreign objects moving across said protruding portions; and

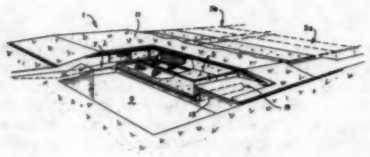
a resilient, compressible, substantially water impervious mass filling substantially all the space within said piston assembly and within said base and biasing said piston assembly upwardly to protrude above said base, said mass minimizing void space in said piston assembly and said base to effectively inhibit accumulation of water therewithin without requiring reliance upon sealing means operating between said piston and said receptacle whereby piston movement preventing ice formation within said chamber is effectively resisted and movability of said piston within said chamber is maintained without regard to ambient climatic conditions.

4,955,983

SIDE LOADING VAULT SYSTEM AND METHOD FOR THE DISPOSAL OF RADIOACTIVE WASTE

Daniel C. Meess, Murrysville; Bobby J. Jones, Pleasant Hills; Raymond M. Mello, Greensburg; Thomas G. Weiss, Jr., and James B. Wright, both of Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 31, 1989, Ser. No. 331,587
Int. Cl.[5] B09B *1/00*; G21F *9/12*
U.S. Cl. 405—128 **28 Claims**



1. A method for the disposal of hazardous radioactive waste, comprising by steps of:

a. constructing a floor slab in the earth;

b. constructing an elongated wall assembly over said floor slab having sidewalls and a front wall and a back wall at either end said side walls being longer than said front and back walls;

c. providing an accessway in said front wall;

d. constructing a ceiling slab over said wall assembly that is supported at least in part by said wall assembly to form a vault cell;

e. inspecting the vault cell for structural defects, and

f. introducing hazardous radioactive waste through the accessway in said front wall and loading said cell with said waste from the back wall to the front wall in rows, each of which is substantially parallel to said back wall to minimize radiation exposure to workers loading the cell, and

g. closing the accessway of the vault cell by constructing a removable wall structure within the accessway.

4,955,984

SAFETY DEBRIS CATCHER

Levearn F. Cuevas, P.O. Box 479, Long Beach, Miss. 39560

Continuation-in-part of Ser. No. 21,087, Mar. 3, 1987, abandoned. This application Jul. 7, 1989, Ser. No. 376,763
Int. Cl.[5] B23B *45/00*
U.S. Cl. 408—67 **4 Claims**

1. A safety debris catcher for a drill, hammer drill, piston drive, and stud gun apparatus and the like having a working component, comprising

a resilient, tubular, sleeve-like bellows having a sleeve at its inner end and a debris collector at its outer end,

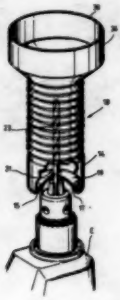
the bellows being compressible axially and fitting around the working component of the apparatus,

the debris collector extending outwardly from the outer end of the bellows and having an outer seating surface adapted to seat against a surface of a wall, ceiling, floor, or construction member,

the debris collector extending beyond the working compo-

nent's outer end a distance so that it can be seated against the surface at a 45° angle to the surface, and

a spinner disk adapted to be connected to the working component,



the sleeve and the disk having interfitting portions rotatably connecting the sleeve and the disk.

4,955,985

VANE PUMP WITH ANNULAR RING FOR ENGAGING VANES AND DRIVE MEANS IN WHICH THE ROTOR DRIVES THE ANNULAR RING

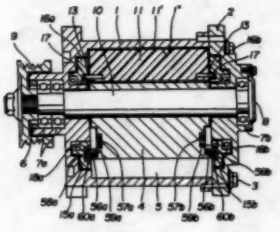
Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 197,548, May 23, 1988, which is a continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, and Ser. No. 110,919, Oct. 21, 1987, abandoned, and Ser. No. 113,568, Oct. 26, 1987, abandoned, and Ser. No. 115,677, Oct. 30, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 394,771

Claims priority, application Japan, Jul. 22, 1986, 61-170903; Jul. 22, 1986, 61-111490[U]; Oct. 23, 1986, 61-161610[U]; Oct. 23, 1986, 61-161609[U]; Nov. 4, 1986, 61-168147[U]; Nov. 4, 1986, 61-168145[U]; Nov. 14, 1986, 61-269961; Nov. 14, 1986, 61-269960[U]; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]

Int. Cl.[5] F04C *2/344*

U.S. Cl. 418—257 22 Claims



1. A rotary machine comprising a housing means having a rotor chamber, said rotor chamber having an inner peripheral surface, a rotor means rotatably mounted in said rotor chamber, said inner peripheral surface having a central axis which is eccentrically disposed relative to the axis of rotation of said rotor means, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means having longitudinal ends and projection means projecting from said longitudinal ends, said housing means having rotatable annular ring means coaxial with said peripheral surface of said rotor chamber, and drive means operatively interconnected between said rotor means and said ring means such that said rotor means rotatably drives said ring means, said ring means having engaging means engaged by said projection means of said vane means such that during rotation of said rotor means and said ring means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages said engaging means to limit the extent of outward radial movement of said vane means from its respective vane slot.

4,955,986

METHOD FOR THE HEAT TREATMENT OF FINELY GRANULAR MATERIAL

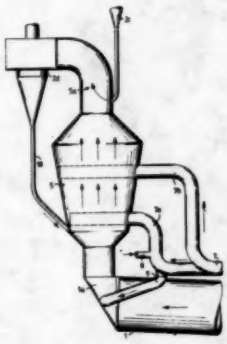
Hans-Dietmar Maury, Ahlen, and Wolfgang Buslowski, Ennigerloh, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 867,644

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3520058

Int. Cl.[5] F27B *15/00*

U.S. Cl. 432—14 3 Claims



1. A method for the heat treatment of finely granular material, particularly for the production of cement, with a preferably multi-stage cyclone preheater, a rotary tubular kiln, a cooler as well as a single kiln off-gas line which is formed between rotary tubular kiln and cyclone preheater and is flow through substantially in upward direction by the off-gasses of the rotary tubular kiln and to which tertiary air is fed in two partial streams for the combustion of an additional fuel from the cooler arranged behind the rotary tubular kiln on the material side, said streams being introduced at different heights into the kiln off-gas line; the method comprising the steps of:

feeding the additional fuel exclusively to the lower partial stream of the tertiary air to provide for sub-stoiciometric combustion in the off-gas line before the entrance of the second partial stream of tertiary air; feeding the second partial stream of the tertiary air to affect a complete combustion of the additional fuel in the upper part of the kiln off-gas line; and

directing the material to be treated, after the conclusion of the complete combustion of the additional fuel, to the kiln off-gas line above the second partial stream of tertiary air.

4,955,987

PROCESS FOR THE PREPARATION OF CONCENTRATED AQUEOUS, SUBSTANTIALLY SALT-FREE SOLUTIONS OF AMINOTRIAZINYL REACTIVE DYES, AQUEOUS DYE SOLUTIONS PRODUCED THEREBY AND PROCESS OF DYEING

Roger Lacroix, Village-Neuf, and Edmond Ruhlmann, St. Louis, both of France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 6, 1985, Ser. No. 805,601

Claims priority, application Switzerland, Dec. 7, 1984, 5821/84

Int. Cl.[5] C09B *62/08, 62/085;* D06P *1/382, 3/66*

U.S. Cl. 8—549 8 Claims

1. A process for the preparation of a concentrated aqueous, substantially salt-free solution of an aminotriazinyl reactive dye, which comprises

(1) reacting cyanuric chloride with an azo dye containing 2 to 5 sulfo groups which are at least partly in the form of an ammonium salt, and one or more radicals capable of reacting with cyanuric chloride, in the presence of lithium hydroxide, and

(2) deionising and concentrating the salt-containing synthesis solution by hyperfiltration.

7. A process for dyeing or printing natural or regenerated cellulosic or nitrogen-containing fibre material, which comprises applying to said fibre material an aqueous dye solution obtained by a process according to claim 1.

4,955,988

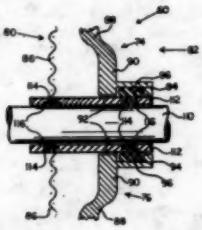
GAS SAFETY VENT DEVICE

Richard F. Fadus, 225 Crescent Cir., Cheshire, Conn. 06410

Filed Apr. 24, 1987, Ser. No. 42,048

Int. Cl.[5] F17D *3/04*

U.S. Cl. 48—193 5 Claims



1. A gas safety means kit having component parts capable of being assembled in the field in surrounding relationship with a pipe to prevent leaking gas from seeping along the exterior of the pipe and entering a building by venting the gas to the atmosphere, the pipe having an outside diameter of a greater magnitude or a lesser magnitude, said component parts comprising the commbination of a gas safety vent device and adapter means, said gas safety vent device including an upper member, a chimney integral with said upper member, and a lower member joinable to said upper member with the pipe passing therebetween, each of said upper and lower members having a first internal cylindrical surface of about 180 degrees in arcuate extent and a second internal cylindrical surface of about 180 degrees in arcuate extent, said first and second cylindrical surfaces of said upper member being coaxial and said first and second cylindrical surfaces of said lower member being coaxial, said first surfaces being of equal diameter about the same as the diameter of greater magnitude and said second surfaces being of equal diameter substantially larger than the diameter of said first surfaces, said first and second surfaces of said upper and lower members being equally spaced from each other, and a first piece of wire mesh material having an outer periphery attached to said second surface of said upper member and an inner cylindrical periphery of about 180 degrees in arcuate extent and spaced a predetermined distance from and coaxial with and of the same diameter as said first internal cylindrical surface of said upper member, and a second piece of wire mesh material having an outer periphery attached to said second surface of said lower member and an inner cylindrical periphery of about 180 degrees in arcuate extent and spaced said predetermined distance from and coaxial with and of the same diameter as said first internal cylindrical surface of said lower member, and said adapter means including a pair of identical semi-cylindrical sleeve halves each having an outside diameter adapted to lie within and conform to said first internal cylindrical surfaces of said upper and lower members and to lie within and conform to said inner cylindrical peripheries of said pieces of wire mesh material and an inside diameter substantially the same as the pipe diameter of lesser magnitude, whereby said upper and lower members are installable directly on a pipe of diameter of said greater magnitude, or are installable on a pipe of diameter of said lesser magnitude with said adapter means interposed between said members and said pipe of diameter of said lesser magnitude, in either case to form a chamber for collecting seeping gas and venting same to the atmosphere through said chimney.

4,955,989

PROCESS FOR CONVEYING A PARTICULATE SOLID FUEL

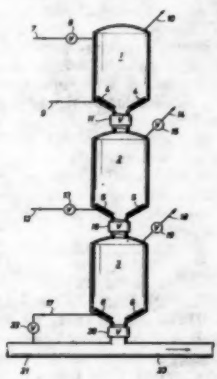
Bernardus H. Mink, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 726,949, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 487,531, Apr. 21, 1983, abandoned. This application Jan. 23, 1987, Ser. No. 8,099

Claims priority, application Netherlands, Jun. 23, 1982, 8202532

Int. Cl.[5] C10J *3/50*

U.S. Cl. 48—197 R 4 Claims



1. A process for conveying particulate solid fuel from an atmospheric container to a reactor, in which reactor the fuel is partially combusted at elevated pressure to synthesis gas with an oxygen-containing gas, comprising passing the fuel from said container to a lock hopper, pressurizing the lock hopper by pressing an inert gas into the lock hopper, passing the fuel from the lock hopper to a pressure vessel, said pressure vessel having at least the same pressure as the pressure in the reactor, and from the pressure vessel to the reactor, said fuel being kept in the fluidized state in the container and the lock hopper by an inert fluidizing gas and in the pressure vessel by a carbon monoxide- and hydrogen-containing fluidizing gas, the fuel being passed from the pressure vessel to the reactor by a carbon monoxide- and hydrogen-containing carrier gas, the fluid-

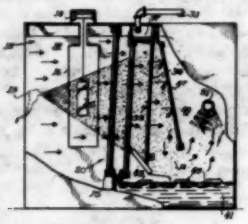
izing gas at the level of a horizontal section of the pressure vessel having an upward velocity which is at least equal to the downward flow rate at which the fuel passes said section.

4,955,990

DISPOSABLE BAFFLE SYSTEM AND METHOD

Stanley C. Napadow, Elgin, Ill., assignor to Protectaire Systems Co., Elgin, Ill.

Filed Dec. 22, 1988, Ser. No. 288,326
Int. Cl.[5] B01D *47/00*
U.S. Cl. 55—90 **17 Claims**



1. A method of operating a paint spray booth comprising the steps of:

spraying articles with a paint spray and generating overspray paint overspray particulates,

impinging at least a majority of the paint overspray particulates onto disposable baffles to coat the forward faces thereof with overspray particulates,

flowing air in a substantially uniform manner through slots between adjacent disposable baffles,

flowing the cleaner and the remaining overspray particulates through a water wash to wet overspray particulates leaving only a small percentage of overspray particulates for emission,

collecting the wetted overspray particulates in a tank of water containing chemicals for agglomerating,

discharging the cleaned air with reduced emissions because of the impinging of paint overspray particulates on the disposable baffles,

accumulating paint on the disposable baffles until a thick coat of paint is accumulated thereon,

removing the disposable baffles from the booth and disposing of the baffles with the paint thereon, and

installing new disposable baffles in the booth to collect paint overspray particulates.

4,955,991

ARRANGEMENT FOR GENERATING AN ELECTRIC CORONA DISCHARGE IN AIR

Vilmos Török, Lidingö, and Andrezej Loreth, Akersberga, both of Sweden, assignors to Astra-Vent AB, Stockholm, Sweden

PCT No. PCT/SE87/00183, § 371 Date Sep. 26, 1988, § 102(e) Date Sep. 26, 1988, PCT Pub. No. WO87/06501, PCT Pub. Date Nov. 5, 1987
PCT Filed Apr. 13, 1987, Ser. No. 252,362
Claims priority, application Sweden, Apr. 21, 1986, 8601817
Int. Cl.[5] B03C *3/00*
U.S. Cl. 55—120 **3 Claims**

1. An arrangement for generating an electric corona discharge in an air flow path which is in communication with a human environment and continuously removing harmful gases produced as a consequence of the corona discharge from the air flow path comprising

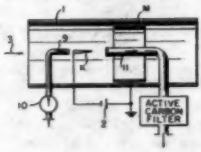
a duct having an air flow therethrough;

a corona electrode, and a target electrode spaced from said corona electrode in said air flow of said duct;

a d.c. voltage source having first and second terminals to which said corona electrode and said target electrode, respectively, are connected, the voltage between said terminals of said voltage source capable of creating a corona discharge at said corona electrode;

piping means to continuously remove harmful gases produced as consequence of said corona discharge, extending from inside said duct and out said duct, and having a first pipe with an orifice at one end of said first pipe;

said orifice of said first pipe located in the vicinity of and



opening in the direction of said corona electrode, and said pipe over the remainder of its length being hermetically sealed relative to said air flow in said duct;

a second pipe having an open end located axially opposite to and spaced from said orifice of said first pipe;

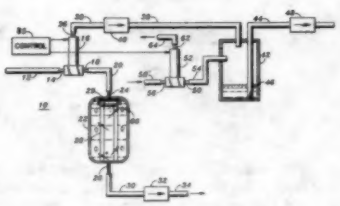
air pumping means connected to said second pipe for generating a jet of air out through said open end of said second pipe closely past said corona electrode and into said orifice of said first pipe.

4,955,992

LIQUID DEGASSING SYSTEM

David L. Goodale, Anaheim, and Bradford K. Hess, Orange, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 67,067, Jun. 26, 1987, abandoned. This application Aug. 9, 1988, Ser. No. 230,663
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—160 **23 Claims**



1. A liquid degassing system comprising:

(a) a liquid intake for receiving liquid from a supply;

(b) a liquid discharge;

(c) a liquid reservoir including:

(i) inlet means for permitting liquid flow into the reservoir from the liquid intake; and

(ii) outlet means for providing liquid flow out of the reservoir to the liquid discharge, the reservoir being located in line between the liquid intake and the liquid discharge such that substantially all liquid from the supply passes into the reservoir from the intake when travelling to the liquid discharge; and

(d) degassification means including:

(i) vacuum means for applying a vacuum to the reservoir for causing the formation of bubbles from gas present within liquid held by the reservoir;

(ii) means connected to the vacuum means for removing the gas from the reservoir, having means for permitting the gas to travel from the reservoir through the inlet means;

(iii) means for preventing liquid from entering the inlet means while removing gas from the inlet means; and
(iv) baffle means mounted within the reservoir, the baffle means including a filter element whereby liquid from the inlet means is adapted to pass through the filter when travelling to the liquid discharge, and whereby gas flow through the filter is inhibited.

4,955,993

SEMI-PERMEABLE HOLLOW FIBER GAS SEPARATION MEMBRANES POSSESSING A NON-EXTERNAL DISCRIMINATING REGION

Edgar S. Sanders, Jr., Pittsburg; John A. Jensvold; Daniel O. Clark, both of Benicia; Frederick L. Coan, Pittsburg; Henry N. Beck, Walnut Creek; William E. Mickols, Martinez; Peter K. Kim, Danville, and Wudneh Admassu, Concord, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 364,723, Jun. 9, 1989, abandoned, which is a continuation of Ser. No. 129,273, Dec. 7, 1987, Pat. No. 4,838,904. This application Jul. 31, 1989, Ser. No. 387,476

Int. Cl.[5] B01D *53/72, 71/50*

U.S. Cl. 55—16 **106 Claims**

1. A semi-permeable hollow fiber membrane comprising a hydrophobic polymeric material, which possesses an equilibrium water content at about 25° C. of less than about 1 weight percent, said hollow fiber membrane having a thin non-external discriminating region and at least one generally porous region, wherein the discriminating region functions to selectively separate at least one gaseous component from other gaseous components in a gas mixture, wherein the discriminating region and porous region(s) are comprised of the same polymeric material.

28. A method for separating at least one gaseous component from other gaseous components of a gas mixture comprising:
(A) contacting the internal surface of a semi-permeable hollow fiber membrane with a feed gas mixture under pressure, wherein the hollow fiber membrane separates a higher pressure region inside the hollow fiber membrane from a lower pressure region outside of the hollow fiber membrane;
(B) maintaining a pressure differential across the hollow fiber membrane under conditions such that at least one gaseous component in the feed gas mixture selectively permeates through the hollow fiber membrane from the inside higher pressure region to the outside lower pressure region;
(C) removing from the outside lower pressure region of the hollow fiber membrane permeated gas which is enriched in at least one gaseous component; and
(D) removing from the inside higher pressure region of the hollow fiber membrane nonpermeated gas which is depleted in at least one gaseous component;
wherein the hollow fiber membrane comprises a hydrophobic polymeric material, which possesses an equilibrium water content at about 25° C. of less than about 1 weight percent, said hollow fiber membrane possessing a thin non-external discriminating region and at least one generally porous region, wherein the discriminating region and porous region(s) are comprised of the same polymeric material.

4,955,994

COMPRESSED GAS APPARATUS

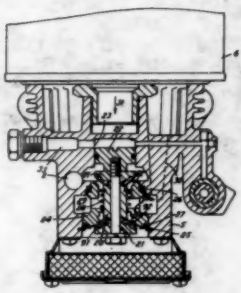
David J. Knight; James M. Kubik, both of Avon Lake, Ohio, and Brian P. Neal, Bristol, United Kingdom, assignors to Allied-Signal Inc., Morristown, N.J. and Bendix Limited, Bristol, England

Filed Jan. 29, 1988, Ser. No. 150,693

Int. Cl.[5] B01D *53/04*

U.S. Cl. 55—163 **5 Claims**

1. Compressed gas treatment apparatus for connection in a compressed gas system between a gas compressor and a gas storage reservoir comprising a housing having an inlet port and moisture removing means for removing moisture from the gas, said housing defining a flow path between said inlet port and the moisture removing means, said flow path including a cavity, first valve means between said inlet port and said cavity, a passage defined within said housing for venting said cavity, and second valve means in said housing for controlling said passage, said flow path defining a downwardly extending section through said first valve means interconnecting the inlet



port with the cavity and an upwardly extending section between the cavity and the moisture removing means, said cavity being defined between said first valve means and the second valve means, and interconnecting means for interconnecting said second valve means with the first valve means for opening said first valve means to permit communication from the inlet port to the cavity while closing said first valve means to prevent communication through said passage and for closing said first valve means to prevent communication from the inlet port to the cavity when the second valve means is open.

4,955,995

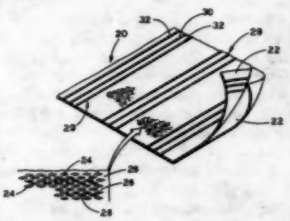
RANGE HOOD FILTER PAD

Jeffrey S. Pontius, Amanda, Ohio, assignor to Columbus Industries, Inc., Ashville, Ohio

Filed Jul. 28, 1989, Ser. No. 386,228

Int. Cl.[5] B01D *46/10, 50/00*

U.S. Cl. 55—274 **7 Claims**



1. In combination with a range hood, a particulate filter comprising:
(a) a support structure;
(b) a filter pad including a plurality of sheets of absorbent paper filter media of non-woven wood fibers, said sheets aligned in adjacent, parallel relationship to one another and supported in said support structure;
(c) a plurality of slits in each sheet expanded to define multi-sided discrete openings for the passage of air and a tortuous path for air flow passing between adjacent sheets;
(d) said support structure and filter pad mounted in said range hood and disposed in an air flow for entrapping particulate matter and organic fat and oil aerosols generated during cooking processes; and
(e) visual indicating means disposed on an outermost sheet of

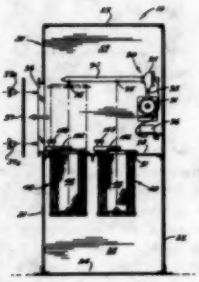
said filter pad comprising a plurality of sets of three parallel spaced lines formed by at least two oil soluble dye components, the center line of each of said sets of lines being a selected first color and the next adjacent lines to said center line being a selected second color different than said first color; said colors being selected to form a visually distinct third color different than said first and second colors upon mixing of said first and second colors at a selected location between said center line and the next adjacent lines in each of said sets.

4,955,996

TOP LOADING DUST COLLECTOR

Robert R. Edwards, Fort Mill, S.C., and William J. Klimczak, Pineville, N.C., assignors to Dustex Corporation, Charlotte, N.C.

Filed May 23, 1989, Ser. No. 355,772
Int. Cl.[5] B01D *46/04*
U.S. Cl. 55—302 10 Claims



1. An apparatus for separating particulate matter from an air flow comprising:

a housing having a hollow interior space;

a dividing wall separating said hollow interior space into a first inlet chamber and a second outlet chamber, said dividing wall including at least one generally circular opening for the air flow to pass through from said inlet chamber to said outlet chamber;

inlet means communicating with said inlet chamber for directing the air flow into said housing;

outlet means communicating with said outlet chamber for exhausting the air flow from said housing;

filter cartridge means comprising a filter element of elongate hollow cylindrical configuration and defining a top end, an opposite bottom end, and an internal passageway extending longitudinally between said top and bottom ends, said filter cartridge means further comprising a bottom plate closing said bottom end of said filter element, and a top mounting plate secured to and overlying said top end of said filter element, said top mounting plate including a central opening aligned with said internal passageway so as to permit passage of air therethrough and further including an annular flange which extends radially beyond the outer periphery of said filter element,

said filter cartridge means being mounted in said one opening in said dividing wall, with said top mounting plate being disposed on the outlet chamber side of said opening, with said annular flange overlying the periphery of said opening, and with said filter element extending into said inlet chamber,

sealing means positioned between said annular flange of said top mounting plate and said dividing wall for surrounding said opening and sealing the interface between said top mounting plate and said dividing wall substantially airtight;

clamping means for releasably retaining said filter cartridge means in said opening of said dividing wall and so as to compress said sealing means between said top mounting plate and said dividing wall; and

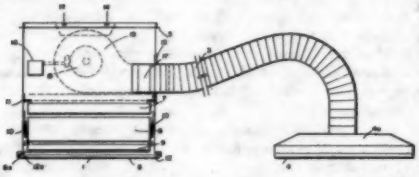
air pulse cleaning means for periodically separating accumulated particulate matter from the surface of said filter element within said inlet chamber and comprising an air delivery pipe positioned in said outlet chamber and including an outlet which is aligned with said one opening in said dividing wall, and means for periodically directing a pulse of pressurized air from said outlet and into said filter cartridge means, and with said pipe being spaced from said one opening in said dividing wall by a distance of at least about the longitudinal dimension of said filter cartridge means, whereby the filter cartridge means is freely and easily removable into said outlet chamber and replaceable without the disassembly of the air pulse cleaning means.

4,955,997

FLUSH MOUNTED CEILING AIR CLEANER

Elmer W. Robertson, III, 3209 Springwood Dr., Jonesboro, Ark. 72401

Filed May 10, 1989, Ser. No. 349,811
Int. Cl.[5] B01D *50/00*
U.S. Cl. 55—316 17 Claims



1. An air cleaner adapted for flush mounting in a suspended ceiling system comprising:

(a) a cabinet enclosing a blower, a blower motor and a plurality of filters, the cabinet having an attachment flange for securing the cabinet to a ceiling support structure, the cabinet including a return air grill located at an outermost end of an inlet side thereof upstream of said plurality of filters, and corresponding in size substantially to a first standard ceiling grid;

(b) at least one plenum chamber having a supply air grill at an outermost end of said plenum chamber and corresponding to in size, and adapted to be supported on, a second standard ceiling grid; and

(c) a flexible conduit connecting said cabinet and said supply air grill, said conduit connected to an outlet side of said cabinet downstream of said plurality of filters, and having a length sufficient to permit said cabinet and supply air grill to be located remote from each other.

4,955,998

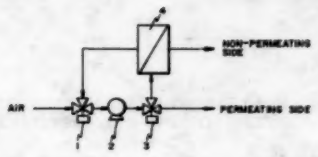
PROCESS FOR SEPARATING GAS

Kanji Ueda, Ashiya; Kazuo Haruna, Kakogawa, and Masahiro Inoue, Shikama, all of Japan, assignors to Sumitomo Seika Chemicals Co., Ltd., Miyanishi, Japan

Continuation-in-part of Ser. No. 233,600, Aug. 18, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,933
Claims priority, application Japan, Aug. 21, 1987, 62-208500
Int. Cl.[5] B01D *53/22*
U.S. Cl. 55—16 4 Claims

1. A process for separating a specific component from air by feeding air to a gas separation membrane module, which comprises the steps of: alternately and repeatedly feeding air under pressure to a non-porous gas separation membrane of a module

selected from the group consisting of a plate-and-frame module, a spiral module and a hollow fiber module; and suctioning



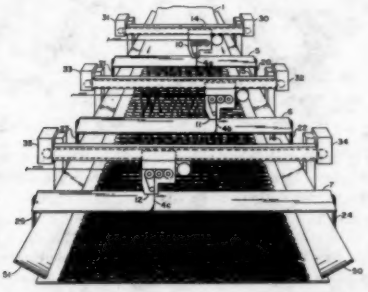
of a permeating gas under vacuum after feeding of air is stopped.

4,955,999

STATIONARY STRAND DEFLECTOR FOR CONTINUOUS STRAND MANUFACTURE

William L. Schaefer, Butler, and Walter J. Reese, North Huntingdon, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 6, 1989, Ser. No. 418,095
Int. Cl.[5] C03B *37/02*
U.S. Cl. 65—4.4 **6 Claims**



1. In the process of manufacturing continuous strand mat wherein strands of continuous fibers are deposited onto the surface of a moving conveyor and across the width thereof by feeding the strands downward from a plurality of feeders toward the surface of the conveyor and where the strands are interrupted in their downward passage before reaching the conveyor, the improvement comprising passing the strands in their downward path onto the surface of a deflector which is mounted independent of the feeder and which has an adjustable surface, said independently mounted deflector being rigidly affixed across the width of the conveyor surface on which the strands are to be deposited and having its surface angled toward the surface of the conveyor to thereby direct the strands downwardly therefrom onto the conveyor surface.

4,956,000

GRADIENT LENS FABRICATION

Robert R. Reeber, Rte. 7, Box 254A; Wei-Kan Chu, 6 Whisper La., both of Chapel Hill, N.C. 27514, and Saiah M. Bedair, 1221 Briar Patch, Raleigh, N.C. 27615

Filed Jun. 28, 1989, Ser. No. 374,111
Int. Cl.[5] C03B *19/00*; C23C *19/04*
U.S. Cl. 65—18.1 **4 Claims**

1. A method of making a lens having an axis and having a radially non-uniform but axially symmetrical distribution of lens material, which comprises the steps of:

positioning a first lens shaping element and a substrate upon which the lens is to be formed so that the first lens shaping element is adjacent the substrate, the first lens shaping element defining an orifice which extends in an axial direction through the first lens shaping element and which has a non-uniform radial distribution about the lens axis;

providing a relative rotation between the first lens shaping element and the substrate about the lens axis;

vaporizing a first lens material;

directing the vaporized first lens material towards the substrate through the orifice of the first lens shaping element; and

condensing the vaporized first lens material at the substrate;

respositioning the first lens shaping element and the substrate to be spaced apart from one another;

positioning a second lens shaping element and the substrate upon which the first lens material has been condensed so

that the second lens shaping element is adjacent the substrate, the second lens shaping element having an orifice which extends in an axial direction through the second lens shaping element and which has a non-uniform radial distribution about the lens axis;

providing a relative rotation between the second lens shaping element and the substrate about the lens axis;

vaporizing a second lens material;

vaporizing a second lens material;

directing the vaporized second lens material towards the substrate through the orifice of the second lens shaping element; and

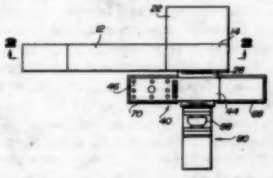
condensing the vaporized second lens material at the substrate onto the condensed first lens material, to thus form a compound lens.

4,956,001

METHOD AND APPARATUS FOR BENDING AND ANNEALING GLASS SHEETS TO BE LAMINATED

Katsuhiko Kitagawa, and Takeshi Maeda, both of Matsusaka, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Oct. 19, 1989, Ser. No. 424,125
Claims priority, application Japan, Oct. 21, 1988, 63-137610[U]; Oct. 31, 1988, 63-275451
Int. Cl.[5] C03B *23/02*
U.S. Cl. 65—107 **12 Claims**



1. A method of consecutively and similarly bending at least two glass sheets to be united into a curved laminated glass member and annealing the curved glass sheets obtained by bending, the method comprising the steps of:

(a) heating a first glass sheet to a shaping temperature suitable for bending of the glass sheet;

(b) in a shaping zone of a furnace bending the heated first glass sheet into a first curved glass sheet and holding the

first curved glass sheet generally horizontally in a lifted position;

(c) bringing a ring-like holder into said shaping zone and laying the first curved glass sheet on said holder;

(d) transferring said holder with the first curved glass sheet laid thereon from said shaping zone into a high-temperature section of an auxiliary furnace which is located adjacent to said furnace, said high-temperature section being maintained at a predetermined temperature close to said shaping temperature;

(e) heating a second glass sheet to said shaping temperature;

(f) in said shaping zone bending the heated second glass sheet into a second curved glass sheet while the first curved glass sheet on said holder is kept in said high-temperature section of said auxiliary furnace and holding the second curved glass sheet generally horizontally in a lifted position;

(g) bringing said holder with the first curved glass sheet laid thereon into said shaping zone and laying the second curved glass sheet on the first curved glass sheet lying on said holder; and

(h) transferring said holder on which the curved glass sheets to be united into said laminated glass member are lying from said shaping zone into a low-temperature section of said auxilary furnace; and

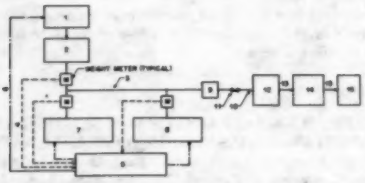
(i) annealing the curved glass sheets lying on said holder in said low-temperature section.

4,956,002

METHOD FOR THE COMPOSTING OF ORGANIC MATERIALS

David J. Egarian, 129 Minnehaha Blvd., Lake Hiawatha, N.J. 07034

Filed Nov. 21, 1989, Ser. No. 439,828
Int. Cl.[5] C05F *9/04, 9/02*
U.S. Cl. 71—9 **39 Claims**



14. A method for composting organic waste materials comprising supplying predetermined amounts of said organic waste martial to a plurality of modular containers including a first modular container and a plurality of second modular containers, holding said predetermined amount of said organic waste material which has been composting for a first period of time in said first modular container and holding said predetermined amounts of said organic waste material which have been composting for a plurality of second periods of time in said plurality of second modular containers, said second periods of time being progressively shorter than said first period of time, said predetermined amounts being selected so that a relatively uniform temperature profile may be maintained within each of said plurality of modular containers, circulating air through said predetermined amounts of said organic waste material in each of said first and said plurality of second modular containers, measuring the temperature in said first and said plurality of second modular containers, interconnecting said first modular container with a selected one of said plurality of second modular containers based upon the measured temperature of said selected one of said plurality of second modular containers being less than said measured temperature of said first modular container by a predetermined temperature difference, and circulation at least a portion of said air which has passed through said organic waste material in said first modular container to said organic waste material in said selected one of said second modular containers, so as to accelerate the composting of said organic waste material in said selected one of said second modular containers.

4,956,003

CYCLOHEXANE-1,3-DIONE DERIVATIVES AND THEIR USE FOR CONTROLLING UNDESIRED PLANT GROWTH

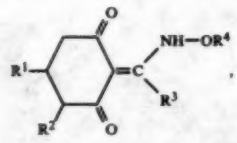
Dieter Jahn, Neckarhausen; Rainer Becker, Bad Durkheim; Norbert Goetz, Worms, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 13,180, Feb. 9, 1987, Pat. No. 4,851,032, which is a continuation of Ser. No. 612,632, May 21, 1984, abandoned, which is a continuation of Ser. No. 461,748, Jan. 28, 1983, abandoned, which is a continuation of Ser. No. 382,307, May 27, 1982, abandoned. This application Mar. 27, 1989, Ser. No. 328,573

Claims priority, application Fed. Rep. of Germany, May 29, 1981, 3121355; Jun. 12, 1981, 3123312

Int. Cl.[5] A01N *43/36*; C07D *207/323*
U.S. Cl. 71—92 **8 Claims**

1. A cyclohexane-1,3-dione derivative of the formula



(I)

where R^1 is pyrazolyl group, and wherein said pyrazolyl group may also be substituted by one or two substituents from the group comprising alkyl of 1 to 3 carbons, halogen, or alkoxy of 1 or 2 carbons, R^2 is hydrogen, methoxycarbonyl or ethoxycarbonyl, R^3 is alkyl of 1 to 4 carbon atoms, and R^4 is alkyl of 1 to 3 carbon atoms, alkenyl of 3 or 4 carbon atoms, haloalkenyl of 3 or 4 carbon atoms and 1 to 3 halogen atoms, or propargyl, or a salt thereof.

8. A process for the control of unwanted plants, wherein the unwanted plants or the area to be kept free from unwanted plant growth is treated with a herbicidally effective amount of a cyclohexane-1,3-dione derivative of the formula I as defined in claim 1.

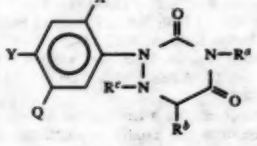
4,956,004

HERBICIDAL TRIAZINEDIONES

George Theodoridis, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

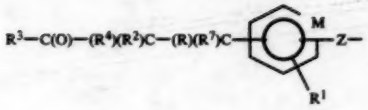
Filed May 10, 1989, Ser. No. 350,053
Int. Cl.[5] C07D *253/70*; A01N *43/707*
U.S. Cl. 71—93 **30 Claims**

1. A herbicidal compound of the formula

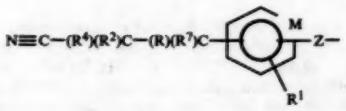


in which

Q is



or



M is CH or N;
Z is O, S, NH or alkylamino;
R^3 is H, OH, alkoxy, alkenyloxy or alkynyloxy, alkoxyalkoxy, alkenyloxyalkoxy or alkynyloxyalkoxy, alkyl, haloalkyl, OZ^2 where Z^2 is of a salt-forming cation, amino, phenylamino, alkylamino, alkenylamino, alkoxyamino or $-NHSO_2R^5$ where R^5 is alkyl, haloalkyl, phenyl, halophenyl or alkoxyphenyl;
R^1 is H, alkyl, halogen, haloalkyl, nitro, NH_2, lower alkoxy, alkylthio or cyano;
R^2 is H, lower alkyl, lower alkenyl, lower alkynyl, halogen, CN, or COR^3;
R is H, lower alkyl, halogen, or lower alkoxy; or R and R^2 together constitute a double bond;
R^4 is H, halogen, lower alkyl, lower alkenyl, or lower alkynyl;
R^7 is H or lower alkyl;
R^b and R^c are each H or together constitute a double bond;
R^a is lower alkyl or lower haloalkyl;
X is H, halogen, lower alkyl, haloalkyl or nitro;
Y is H, halogen, alkyl, alkoxy, alkylthio, haloalkyl, $-SOCF_3$ or halo lower alkoxy; and
in which any alkyl, alkenyl, alkynyl, or alkylene moiety has up to about 6 carbon atoms.

4,956,005

HERBICIDAL ORTHOSULFONAMIDE BENZENE SULFONYLUREAS

Donald J. Dumas, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

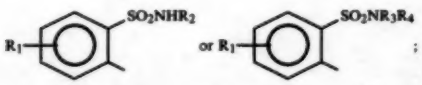
Division of Ser. No. 810,336, Dec. 23, 1985, Pat. No. 4,802,906, which is a continuation-in-part of Ser. No. 703,669, Feb. 21, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 271,155

Int. Cl.[5] A01N *43/66, 43/68, 43/70;* **C07D** *251/52*

U.S. Cl. 71—93 **33 Claims**

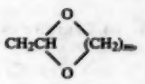
1. A compound of the formula

and their agriculturally suitable salts, wherein:
J is

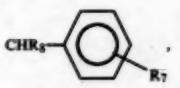


J-1 J-2

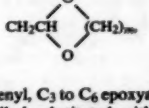
W is O or S;
R is H or CH_3;
R_1 is H, C_1 to C_3 alkyl, C_1 to C_3 haloalkyl, halogen, nitro, C_1 to C_3 alkoxy, $SO_2NR_aR_b$, C_1 to C_3 alkylthio, C_1 to C_3 alkylsulfinyl, C_1 to C_3 alkylsulfonyl, CN, CO_2R_c, C_1 to C_3 haloalkoxy, C_1 to C_3 haloalkylthio, C_2 to C_3 alkoxyalkyl, C_2 to C_3 haloalkoxyalkyl, C_2 to C_3 alkylthioalkyl, C_2 to C_3 haloalkylthioalkyl, C_2 to C_3 cyanoalkyl or NR_dR_e;
R_a is H, C_1 to C_4 alkyl, C_2 to C_3 cyanoalkyl, methoxy or ethoxy;
R_b is H, C_1 to C_4 alkyl or C_3 to C_4 alkenyl; or
R_a and R_b can be taken together as $-(CH_2)_3-$, $-(CH_2)_4-$, $-(CH_2)_5-$ or $-CH_2CH_2OCH_2CH_2-$;
R_c is C_1 to C_4 alkyl, C_3 to C_4 alkenyl, C_3 to C_4 alkynyl, C_2 to C_4 haloalkyl, C_2 to C_3 cyanoalkyl, C_5 to C_6 cycloalkyl, C_4 to C_7 cycloalkylalkyl or C_2 to C_4 alkoxyalkyl;
R_d and R_e are independently H or C_1 to C_2 alkyl;
R_2 is C_2 to C_6 haloalkenyl, C_3 to C_6 cycloalkyl, C_3 to C_6 cycloalkyl optionally substituted with 1 or 2 CH_3 groups, C_4 to C_7 cycloalkylalkyl, C_5 to C_6 cycloalkenyl, C_3 to C_6 epoxyalkyl, C_2 to C_6 haloalkyl, $CH_2CH(OR_5)_2$,



phenyl which may be optionally substituted with R_7,



$CH_2C(O)CH_3$, CN, OR_9, C_1 to C_6 alkyl substituted with OR_9, $S(O)_nR_{10}$ or $NR_{11}R_{12}$, Q, CHR_8Q or CH_2CH_2Q;
R_3 is C_1 to C_6 alkyl, C_3 to C_6 alkenyl, C_3 to C_6 alkynyl, C_3 to C_6 cycloalkyl which can be optionally substituted with 1 or 2 CH_3 groups, C_4 to C_7 cycloalkylalkyl, C_5 to C_6 cycloalkenyl, C_1 to C_6 haloalkyl, C_1 to C_5 alkoxy, C_3 to C_6 epoxyalkyl or C_1 to C_6 alkyl substituted with OR_9, $S(O)_nR_{10}$, $NR_{11}R_{12}$ or $P(O)(OR_5)_2$;
R_4 is C_1 to C_3 alkyl substituted with 1–3 atoms of F, Cl or Br, C_3 to C_4 alkynyl, $CH_2CH(OR_5)_2$,

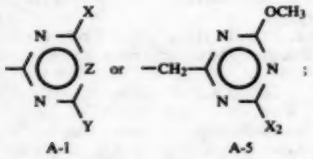


C_2 to C_6 haloalkenyl, C_3 to C_6 epoxyalkyl, $CH_2C(O)CH_3$, CN, C_1 to C_6 alkyl substituted with OR_9, $S(O)_nR_{10}$ or $NR_{11}R_{12}$, Q, CHR_8Q or CH_2CH_2Q;
R_3 and R_4 can be taken together with the sulfonamide nitrogen to form a saturated 5-or 6-membered ring substituted by one or more groups selected from L or a partially saturated 5- or 6-membered ring optionally substituted by one or more groups selected from L;
R_5 is C_1 to C_3 alkyl;
R_6 is C_1 to C_5 alkyl;
R_7 is H, C_1 to C_3 alkyl, halogen, NO_2, CF_3, CN or C_1 to C_3 alkoxy;
R_8 is H or CH_3;
R_9 is H, SO_2R_5, $C(O)R_5$, CO_2R_5, $C(O)NR_{11}R_{12}$ or $P(O)(OR_5)_2$;
R_{10} is C_1 to C_3 alkyl;
R_{11} is H or C_1 to C_3 alkyl;
R_{12} is H or C_1 to C_3 alkyl;
m is 2 or 3;
n is 0, 1 or 2;
Q is a heterocycle selected from the sulfonamide nitrogen pyrrolidine, pyrrole, dithiolane, tetrahydrofuran, dioxane, thiazole,

thiadiazole, pyrimidine and pyridine optionally substituted by one or more groups selected from L;

L is C_1 to C_4 alkyl, C_1 to C_3 haloalkyl, halogen, C_1 to C_3 alkoxy, C_1 to C_3 alkylthio, C_3 to C_4 alkenyloxy, C_3 to C_4 alkenylthio, C_1 to C_2 haloalkoxy or C_1 to C_2 haloalkylthio;

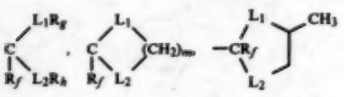
A is



A-1 A-5

X is H, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_1 to C_4 haloalkoxy, C_1 to C_4 haloalkyl, C_1 to C_4 haloalkylthio, C_1 to C_4 alkylthio, C_2 to C_5 alkoxyalkyl, C_2 to C_5 alkoxyalkoxy, amino, C_1 to C_3 alkylamino or di(C_1 to C_3 alkyl)amino;

Y is H, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_1 to C_4 haloalkoxy, C_1 to C_4 haloalkylthio, C_1 to C_4 alkylthio, C_2 to C_5 alkoxyalkyl, C_2 to C_5 alkoxyalkoxy, amino, C_1 to C_3 alkylamino, di(C_1 to C_3 alkyl)amino, C_3 to C_4 alkenyloxy, C_3 to C_4 alkynyloxy, C_2 to C_5 alkylthioalkyl, C_1 to C_4 haloalkyl, C_3 to C_5 cycloalkyl, C_2 to C_4 alkynyl, $C(O)R_5$



or $N(OCH_3)CH_3$;

L_1 and L_2 are independently O or S;

R_f is H or CH_3;

R_g and R_h are independently C_1 to C_2 alkyl;

Z is N; and

X_2 is CH_3 or OCH_3;

provided that:

(a) when A is A-1, then R_2 is other than CH_2CF_3;

(b) when R_3 or R_4 is CH_2CF_3, then the other is CHF_2, CH_2CH_2F, CH_2CH_2Cl, CH_2CH_2Br or CH_2CF_3;

(c) when R_4 is CF_2H, then R_3 is other than C_1 to C_3 alkyl;

(d) when R_4 is C_3 to C_4 alkynyl, then R_3 is CHF_2, CH_2CH_2F, CH_2CH_2Cl, CH_2CH_2Br or C_3 to C_4 alkynyl;

(e) neither X nor Y is OCF_2H; and

(f) when R_1 is H, then R_2 is other than OR_6.

23. A method for the control of undesirable vegetation comprising applying to the locus of such vegetation an herbicidally effective amount of a compound of claim 1.

4,956,006

SUBSTITUTED 1-PHENYL PYRROLIDONES AND THEIR USE AS HERBICIDES

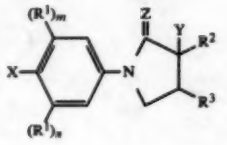
Frank X. Woolard, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Dec. 27, 1988, Ser. No. 291,081

Int. Cl.[5] **C07D** *207/26, 403/06;* **A01N** *43/36*

U.S. Cl. 71—95 **54 Claims**

37. A method of controlling undesirable vegetation comprising applying to said vegetation or to the locus thereof an herbicidally effective amount of a compound having the formula



in which:

R^1 is a member selected from the group consisting of halogen, trifluoromethyl, cyano, CH_3, CF_2CHF_2, OCF_2CHF_2, $OCHF_2$, OCF_3, SCH_3, $S(O)CH_3$, SO_2CH_3, methoxyiminomethyl, methoxyimino-1-ethyl, benzoyloxyiminomethyl, benzoyloxyimino-1-ethyl, pyridyloxy, and pyridyloxy substituted with one or more members of the group consisting of halogen and trifluoromethyl;

R^2 is a member selected from the group consisting of halogen, cyano, carboxy, carbalkoxy containing an alkyl group of 1 to 8 carbon atoms, and carbalkoxy containing an alkyl group of 1 to 8 carbon atoms substituted with a member selected from the group consisting of halogen, trifluoromethyl and phenyl;

R^3 is a member selected from the group consisting of C_1–C_4 alkyl and C_2–C_4 alkenyl;

X is a member selected from the group consisting of H and halogen;

Y is a member selected from the group consisting of H and halogen;

Z is a member selected from the group consisting of O and S; and

m and n are independently zero or 1.

4,956,007

NITRAMINODIARYL SULFOXIDE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL AND PESTICIDAL COMPOSITIONS CONTAINING THEM

János Kreidl; Péter Turcsányi; Béla Stefkó; Judit Mészáros née Brill, and Erika Bogsch, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyor Rt., Budapest, Hungary

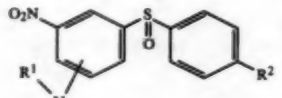
Filed Feb. 28, 1985, Ser. No. 706,705

Claims priority, application Hungary, Feb. 29, 1984, 814/84

Int. Cl.[5] **A01N** *41/00;* **C07C** *93/14*

U.S. Cl. 71—103 **8 Claims**

1. An anthelmintic method of treatment which comprises the step of administering to a mammalian subject, a therapeutically effective amount of the compound of the Formula (I)



wherein

R and R^1 are hydrogen or C_1 to C_6 alkyl; and

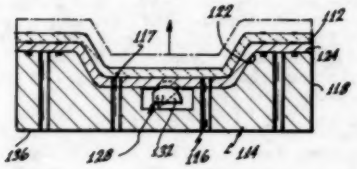
R^2 is hydrogen, halogen, C_1 to C_6 alkyl, C_1 to C_6 alkoxy, or phenyl or phenylthio both optionally substituted by at least one halogen or nitro substituent.

4,956,008

APPARATUS FOR SUPERPLASTIC FORMING AND EJECTION OF A PART FROM A DIE

Frederick T. McQuilkin, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 22, 1986, Ser. No. 909,545
Int. Cl.[5] B21D 45/02
U.S. Cl. 72—427 **7 Claims**



1. An apparatus for superplastic forming and ejection from its die of a metallic workpiece, comprising:

a die, said die having a face at least a portion of which defines a cavity;

a liner, said liner removably positioned in said cavity, said liner having a first surface positioned adjacent said face, the workpiece positioned to form against said liner on a second surface of said liner opposite said first surface; and

ejecting means for ejecting the liner with the formed workpiece thereon from the cavity, said ejecting means including:

a rotary cam mounted in said die, said cam positioned proximal said first liner surface adjacent said die face so that a lobe of said cam movably contacts said liner to move the liner away from said die upon rotation of said cam;

means for rotating said cam, said means for rotating operably connected to said cam.

4,956,009

CALCIUM ALLOY STEEL ADDITIVE AND METHOD THEREOF

James W. Robison, Jr., Wexford, Pa., assignor to Reactive Metals and Alloys Corporation, West Pittsburg, Pa.

Continuation-in-part of Ser. No. 232,968, Aug. 17, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 456,530
Int. Cl.[5] C21C 7/06, 7/064
U.S. Cl. 75—307 **10 Claims**

1. A granular alloy additive for use in the treatment of molten steel comprising granules of alloyed calcium and aluminum having a ratio of not more than 2.85:1 nor less than 0.35:1 calcium to aluminum by weight, which granules during immersion in the steel will form a boundary layer adjacent their outer surface and wherein the granules are sized such that substantially all of the granule is consumed in the formation of the boundary layer, the granules being larger than 35 mesh.

4,956,010

METHOD OF DESULPHURIZING PIG-IRON

Michel Douchy, Solesmes, France, assignor to Affival, France

Filed Apr. 12, 1989, Ser. No. 336,860
Claims priority, application France, Apr. 14, 1987, 88 04927
Int. Cl.[5] C21C 7/02
U.S. Cl. 75—304 **18 Claims**

1. A method of desulphurizing liquid pig-iron comprising the steps of:

contacting the liquid pig-iron with a metal selected from the group consisting of Na, K, Mg, Ca and mixtures thereof, in a form selected from the group consisting of oxide, carbonate, carbide and mixtures thereof; and

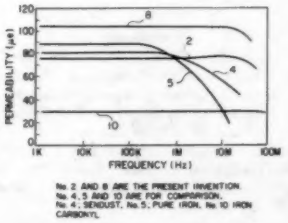
introducing a filled wire in the liquid pig-iron, the wire having an axial zone surrounded by an intermediate tubular metallic wall, the axial zone containing metallic magnesium in a form selected from the group consisting of alloyed metallic magnesium, unalloyed metallic magnesium, and mixtures thereof, the magnesium in alloyed or unalloyed form comprising at least 40% of the mass of the material in the axial zone, the wire also containing a annular zone between the intermediate wall and an outer tubular metallic skin, the annular zone containing a second material.

4,956,011

IRON-SILICON ALLOY POWDER MAGNETIC CORES AND METHOD OF MANUFACTURING THE SAME

Tokuhiko Nishida, and Masao Yamamiya, both of Kawasaki, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 17, 1990, Ser. No. 466,605
Int. Cl.[5] C22C 29/00
U.S. Cl. 75—230 **6 Claims**



No. 2 AND 8 ARE THE PRESENT INVENTION.
No. 4, 5 AND 10 ARE FOR COMPARISON.
No. 4 : SENDUST, No. 5 : PURE IRON, No. 10 IRON CARBONYL

1. An Fe-Si alloy powder core comprising an insulating binder and an alloy powder of an average particle diameter of 10–100 μm, produced by water atomization, in which the composition by weight of the alloy powder is 2–12% silicon and 0.05–0.95% oxygen with the balance being essentially iron.

4,956,012

DISPERSION ALLOYED HARD METAL COMPOSITES

Robert S. Jacobs, Greensburg, and Jack Krall, Latrobe, both of Pa., assignors to Newcomer Products, Inc., Latrobe, Pa.

Filed Oct. 3, 1988, Ser. No. 252,531
Int. Cl.[5] C27C 29/02
U.S. Cl. 75—236 **17 Claims**

1. A sintered hard metal composite comprising unsintered nodules of a pre-blended hard metal powder of a first grade uniformly dispersed among unsintered nodules of a pre-blended hard metal of a second grade, said hard metal powder of a first grade and said hard metal powder of a second grade having distinctively different properties from each other, wherein the integrity of the constituent grades is maintained

after sintering, and the resulting composite exhibits hardness and toughness properties greater than the average of those

properties of the hard metal powder of the first grade and the hard metal powder of the second grade.

4,956,013

REFRACTORY COATING COMPOSITION

Hideo Motoki, Ibaraki, Japan, assignor to Shikoku Kaken Kogyo Co., Ltd., Ibaraki, Japan

PCT No. PCT/JP87/00755, § 371 Date Jun. 7, 1988, § 102(e) Date Jun. 7, 1988, PCT Pub. No. WO88/02740, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 7, 1987, Ser. No. 221,830

Claims priority, application Japan, Oct. 7, 1986, 61-238703

Int. Cl.[5] C04B *7/02, 14/18, 14/20, 24/00*

U.S. Cl. 106—675 5 Claims

1. A refractory coating composition consisting essentially of:

(i) 100 parts by weight of portland cement,

(ii) 3 to 50 parts by weight of a powdered re-emulsion resin,

(iii) 50 to 6000 parts by weight of a mixture of 15 to 85% by weight of aluminum hydroxide powder and 85 to 15% by weight of a carbonate decomposable at a temperature of 300° and 1000° C, and

(iv) 20 to 300 parts by weight of a lightweight aggregate having at least 50% open cells based on the total cells.

4,956,014

ELECTROLESS COPPER PLATING SOLUTION

Koji Kondo, Chiryu; Katuhiko Murakawa, Obu; Kaoru Nomoto, Okazaki; Futoshi Ishikawa, Nagoya; Nobumasa Ishida, Chiryu, and Junji Ishikawa, Nagoya, all of Japan, assignors to Nippondenso Co. Ltd., Kariya, Japan

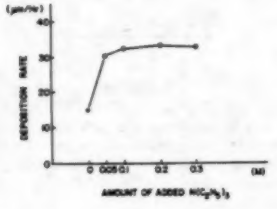
Continuation of Ser. No. 119,861, Nov. 13, 1987, Pat. No. 4,814,009. This application Mar. 20, 1989, Ser. No. 325,536

Claims priority, application Japan, Nov. 14, 1986, 61-269806; Oct. 21, 1987, 62-264016

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.[5] C23C *18/40;* B05D *1/18*

U.S. Cl. 106—1.23 10 Claims



1. An electroless copper plating solution comprising a copper salt, a complexing agent for copper ion, a reducing agent, a pH-adjustor and an accelerator selected from the group consisting of trimethylamine, triethylamine, tripropylamine, tributylamine, dimethylethylamine, diethylmethylamine, diethylpropylamine, dipropylethylamine, trihexylamine, tris(4-bromophenyl)amine, tribenzylamine, N-ethyldibenzylamine, ethyldiethanolamine, diethylaminoethanol, N-methylpiperidine, N-methylmorpholine, N-ethylpiperidine, and N-ethylmorpholine.

4,956,015

POLISHING COMPOSITION

Taizo Okajima, Kitakyushu; Kouichi Ootani, Nohgata, and Tsutomu Yamada, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jan. 18, 1989, Ser. No. 298,048

Claims priority, application Japan, Jan. 19, 1988, 63-9385; Feb. 9, 1988, 63-27941

Int. Cl.[5] C09G *1/02*

U.S. Cl. 106—3 24 Claims

1. A polishing composition comprising water, α-alumina and boehmite wherein the α-alumina is in an amount of from 1 to 30% by weight and the boehmite is in an amount of from 0.1 to 20% by weight, based on the total amount of the composition.

4,956,016

ANTICORROSIVE AGENTS AND USE THEREOF

Reinhard Opitz, Dueren, and Lutz Schellenberg, Koeln, both of Fed. Rep. of Germany, assignors to Gerhard Collardin GmbH, Koeln-Ehrenfeld, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,889

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806675

Int. Cl.[5] C09D *5/08;* C23F *11/18*

U.S. Cl. 106—14.12 16 Claims

1. A process for inhibiting the corrosion of a metal surface by contact between said metal surface and an aqueous solution consisting essentially of:

(a) a component selected from the group of water-soluble alkali metal tetraborate salts;

(b) a component selected from the group of water-soluble alkali metal tripolyphosphate salts; and

(c) water; and, optionally,

(d) a component of one or more surfactants.

4,956,017

NON-VOLATILE 1,1,1-TRICHLOROETHANE INHIBITORS

Felipe A. Donate; George E. Hartwell, both of Midland, Mich.; Bruce D. DeBolt, Surfside, Tex.; James G. Papajesk, Bay City, Mich., and Mark V. Buzzard, Chicago, Ill., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 5, 1989, Ser. No. 348,246

Int. Cl.[5] C08K *5/02*

U.S. Cl. 106—311 13 Claims

12. A solvent-based paint formulation comprising paint and from about 10 to about 90 volume percent 1,1,1-trichloroethane containing a stabilizing amount of a non-volatile polyether with an average molecular weight of at least about 550 and no greater than about 8500 and having at least one terminal moiety selected from the group consisting of hydroxy, amine, substituted amine, cyano, ether, ester and urethane.

13. The formulation of claim 12 wherein the stabilized 1,1,1-trichloroethane comprises from about 40 to about 60 percent of the formulation.

4,956,018

PREPARATION OF STRONG AND SOFT-TEXTURED SURFACE COATING PIGMENTS

Joachim Kranz, Ludwigshafen, and Alois Wiesenberger, Lambsheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,097

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740977

Int. Cl.[5] C04B *14/00*; C09B *67/50*; C08K *5/00*

U.S. Cl. 106—401 9 Claims

1. In a process for preparing a strong and soft-textured surface coating pigment by grinding the crude pigment together with an inorganic grinding aid in the presence of an organic liquid in a comminutor, the improvement comprising grinding in the presence of a phthalic diester of a C_1–C_{15}-alkanol or an alkoxyalkanol of from 3 to 15 carbon atoms in total, phenoxyethanol, 2-phenylethanol, a C_1–C_4-alkyl benzoate or a mixture thereof as the organic liquid.

4,956,019

FLAKY COLOR PIGMENT AND PROCESS FOR PRODUCING THE SAME

Tamio Noguchi, Iwaki, and Takaji Watanabe, Omiya, both of Japan, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Aug. 13, 1987, Ser. No. 84,945

Claims priority, application Japan, Aug. 13, 1986, 61-188614

Int. Cl.[5] C09C *3/06*, *1/04*

U.S. Cl. 106—415 14 Claims

1. A flaky colored pigment comprising a flaky powder substrate with a layer of zinc oxide on the substrate surface and on said zinc oxide layer an inorganic colored pigment layer or comprising a flaky powder substrate with an inorganic colored pigment layer on the substrate surface and on said inorganic colored pigment layer a zinc oxide layer, in each case said inorganic colored pigment layer being deposited from a suspension of said inorganic colored pigment which has been added to said suspension in the form of already-formed pigment particles.

4,956,020

INHIBITING POPCORN POLYMER GROWTH

Sadao Nakajima, Mie, Japan, assignor to Hakuto Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,124

Int. Cl.[5] B08B *9/00*

U.S. Cl. 134—22.19 8 Claims

1. A method for the inhibition of popcorn polymer growth by treating a popcorn polymer on the inner surface of an olefin production apparatus with a popcorn polymer growth inhibitor in an amount of 0.5 to 10% by weight in a medium while the operation of the apparatus is suspended and olefins are substantially removed from the apparatus,

said popcorn polymer growth inhibitor comprising one compound selcted from the group consisting of hydroquinone, 2,6-di-t-butyl-p-cresol, N,N'-di-sec-butyl-p-phenylnediamine, phenothiazine, 2-methyl-4-nitroso-phenol, N-nitrosophenyl hydroxylamine, p-nitroso phenyl, hydroxylamine, N,N-diethylhydroxylamine, hydrazine, monoethanol amine, ethylene diamine, octyl mercaptan and thioglycolic acid 2-ethylhexyl ester,

said medium comprising one member selected from the group consisting of water, a water-soluble organic acid and a mineral oil.

4,956,021

STAIN CLEANING METHOD

Joseph E. Kerze, 17446 Hatteras St., Encino, Calif. 91316

Filed Feb. 6, 1990, Ser. No. 475,447

Int. Cl.[5] B08B *7/04*

U.S. Cl. 134—40 10 Claims

1. A method for cleaning hydrocarbon stains from a hard surface comprising surrounding the stain on the surface with means to contain a liquid solvent, filling said containing means with an organic chemical solvent which is completely miscible with petroleum hydrocarbons which are liquid at ambient temperature and pressure, allowing the solvent to remain on the surface for a period of from 1 to 24 hours, removing the solvent and placing on the surface an absorbant material which does not dissolve in the solvent, allowing the absorbant material to remain on the surface from 1 to 24 hours, then removing the absorbant material and allowing the surface to air dry.

4,956,022

CHEMICAL POLISHING OF ALUMINUM ALLOYS

Issa S. Mahmoud, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 145,806, Jan. 15, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 378,464

Int. Cl.[5] C23G *1/02*

U.S. Cl. 134—41 12 Claims

1. A method of polishing aluminum alloys comprising the steps of:

immersing clean aluminum alloy workpieces in a solution consisting essentially of per liter

from about 588 to about 940 milliliters phosphoric acid;

73 to 118 milliliters nitric acid;

30 to 48 grams sodium nitrate;

88 to 142 milliliters of water;

for a period of about 0.8 to 3.2 minutes at a temperature in the range of about 80 to 90 degrees centigrade; and

rinsing the workpieces in deionized water.

4,956,023

INTEGRATED SOLAR CELL DEVICE

Kazunori Tsuge; Toshihito Endo; Kenji Kobayashi, and Yoshihisa Tawada, all of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

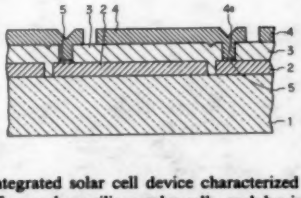
PCT No. PCT/JP88/00319, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989, PCT Pub. No. WO88/07768, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 30, 1988, Ser. No. 286,180

Claims priority, application Japan, Mar. 31, 1987, 62-80363

Int. Cl.[5] H01L *31/05*

U.S. Cl. 136—244 14 Claims



1. An integrated solar cell device characterized in that a plurality of amorphous silicon solar cells, each having a transparent electrode on the light impinging side, an amorphous silicon layer, and a metal electrode on the side opposite the light impinging side, are placed on a transparent substrate, and the plurality of solar cells are connected in series or series-parallel using the transparent electrode and the metal electrode thereof, wherein a conductive anti-oxidation film made from a metal silicide is formed between the transparent electrode and the metal electrode at the series connection, and between the amorphous silicon layer and the metal electrode.

4,956,024

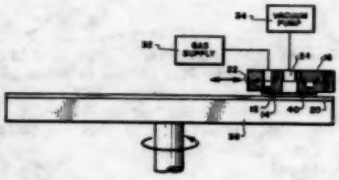
NON-CONTACTING METHOD OF CLEANING SURFACES WITH A PLANOAR GAS BEARING

Robert L. Dean, Castro Valley; Lydia J. Young, Palo Alto, and Lee H. Veneklasen, Castro Valley, all of Calif., assignors to The Perkin Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 325,107, Mar. 17, 1989, abandoned, which is a continuation of Ser. No. 142,173, Jan. 11, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 391,715

Int. Cl.[5] B08B *5/02*

U.S. Cl. 134—37 **20 Claims**



1. A method of cleaning very small particulates, on the order of 1 or 2 microns, from a surface, comprising the steps of:

forming a thin gas film on said surface between a cleaning device and said surface by impinging pressurized gas on said surface,

said gas film being planar and having the thickness in the order of 20 to 30 microns and providing a high velocity gas flow between said cleaning device and said surface, and

moving said film across said surface.

4,956,025

PROCESS FOR PRODUCING COLD-ROLLED HIGH STRENGTH STEEL SHEET HAVING EXCELLENT FORMABILITY AND CONVERSION-TREATABILITY

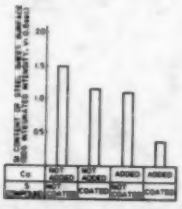
Kazuo Koyama; Taketoshi Taira, both of Kimitsu; Kaoru Kawasaki, Kitakyushu; Atsushi Itami, and Nobuhiko Matsuzu, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,120

Claims priority, application Japan, Jan. 14, 1988, 63-6193; Oct. 7, 1988, 63-252098

Int. Cl.[5] C21D *8/04*

U.S. Cl. 148—12 C **14 Claims**



1. A process for producing a cold-rolled high strength steel sheet having an excellent formability and conversion-treatability, comprising the steps of:

heating to a temperature of 1150° C. or lower a steel slab comprising

C: 0.005 wt % or less,

Si: 0.5–1.5 wt %,

Mn: 0.1–0.5 wt %,

Ti: 0.003–0.05 wt % and at least 3.4×N wt %,

Nb: 0.003–0.05 wt % and at least 7.8×C wt %,

Al: 0.01–0.1 wt %,

P: 0.05–0.15 wt %,

S: 0.010 wt % or less,

N: 0.005 wt % or less,

B: 0.0001–0.0050 wt %,

the balance consisting of Fe and unavoidable impurities,

hot-rolling said steel slab with a finishing rolling temperature of the A_{r3} point of said steel or higher to obtain a hot-rolled steel sheet,

cooling the hot-rolled steel sheet at a cooling rate of 10° C./sec or more in the stage between said finishing rolling and the following coiling step, with the provision that said cooling is started not later than 2 sec after said hot-rolling is finished and is continued for a duration of at least 3 sec,

coiling the steel sheet at a temperature of 650° C. or higher,

cold-rolling the steel sheet at an ordinary rolling draft,

coating the surface of the cold-rolled steel sheet with one or more sulfur compounds in an amount such that after the following continuous-annealing step the surface of the continuous-annealed steel sheet has a sulfur content of from 0.01 to 1.0 wt %, and

continuous-annealing said cold-rolled steel sheet at a heat-cycle of holding for 1 sec or longer at a temperature of 930° C. or lower to complete the recrystallization of said cold-rolled steel sheet.

4,956,026

COATED ARTICLE HAVING A BASE OF AGE-HARDENED METAL

James A. E. Bell, Oakville, Canada, assignor to Inco Limited, Toronto, Canada

Division of Ser. No. 169,283, Mar. 27, 1985. This application May 8, 1989, Ser. No. 348,941

Claims priority, application Canada, Jul. 4, 1987, 534009

Int. Cl.[5] C22F *1/08, 1/10, 1/14*; C21D *9/00*

U.S. Cl. 148—127 **12 Claims**

1. A process for producing an age-hardened article having on the surface thereof a layer of precious metal from the group consisting of gold and platinum group metals comprising:

(a) providing in a condition to be age-hardened a nickel and/or cobalt surfaced structure having a base of an alloy age-hardenable in the range of 300° to about 600° C.;

(b) depositing on at least part of the surface of said structure a layer of said precious metal correlated in thickness to the time and temperature of age-hardening such that after age-hardening said precious metal will have a surface nickel plus cobalt content of about 1% to about 10% by weight effective to increase the wear-resistance of said layer of precious metal; and

(c) thereafter age-hardening said structure having said base and said precious: metal layer to thereby effect:

(1) interdiffusion of said precious metal and said nickel to enhance both the adhesion of said precious metal layer to said base and enhanced wear-resistance of said precious metal without destruction of the inherent qualities of said precious metal; and

(2) hardening of said base alloy.

4,956,027

TREATMENT OF CHROMATE COATING

Kenshi Saeki, Kanagawa; Noriaki Yoshitake, Tokyo, and Takayuki Aoki, Kanagawa, all of Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 57,067, Jun. 1, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,330

Claims priority, application Japan, Jun. 13, 1986, 61-136030

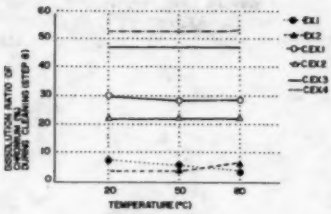
Int. Cl.[5] C23C *22/30*

U.S. Cl. 148—257 **11 Claims**

1. A process for producing a dissolution resistant protective coating containing chromate on a metallic surface, said process comprising the steps of:

(A) contacting the metal surface with an aqueous chromium containing solution;

(B) drying the surface contacted in step (A); and



(C) contacting the dried surface from step (B) with an aqueous solution containing hydraxine in a reducing-effective amount under reducing-effective conditions.

4,956,028

EXPLOSIVE COMPOSITIONS

John W. Forsberg, Mentor-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 931,377, Nov. 14, 1986, Pat. No. 4,840,687. This application Jun. 16, 1989, Ser. No. 367,185

Int. Cl.[5] C06B *45/00*

U.S. Cl. 149—2 **53 Claims**

1. An explosive composition comprising a discontinuous oxidizer phase comprising at least one oxygen-supplying component, a continuous organic phase comprising at least one water-immiscible organic liquid, and an emulsifying amount of at least one nitrogen-containing emulsifier derived from

(A) at least one carboxylic acylating agent,

(B) at least one polyamine, and

(C) at least one acid or acid producing compound capable of forming at least one salt with said polyamine, component (B) being bonded to component (C) through at least one salt linkage.

4,956,029

ELECTRICALLY PRIMABLE IGNITER CHARGES FOR CASELESS AMMUNITION AND PROPELLANT CARTRIDGES

Rainer Hagel, Lichtenfels; Klaus Redecker, Nuremberg, and Horst Penner, Furth, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Mar. 11, 1988, Ser. No. 166,985

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707694

Int. Cl.[5] C06B *45/10*; F42C *19/12*

U.S. Cl. 149—19.8 **8 Claims**

1. An electrically primable igniter charge which comprises an oxidizing agent in a mixture with an initiating explosive, a conductive material and a binder, the charge containing 5 to 70% by weight of zinc peroxide as the oxidizing agent; as the initiating explosive, 20 to 70% by weight of an explosive which does not trigger a detonation in direct contact with a nitrocellulose propellant charge powder molding; 0.5 to 20% by weight of the conductive material consisting of electrically conductive fibers; and 1 to 30% by weight of the binder.

4,956,030

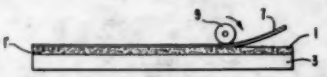
METHOD OF FABRICATING SIMULATED STONE SURFACES AND IMPROVED SIMULATED STONE PRODUCTS

David Baskin, Duxbury, Mass., assignor to Academy of Applied Science, Concord, N.H.

Continuation-in-part of Ser. No. 235,702, Aug. 18, 1988, Pat. No. 4,877,656, and a continuation of Ser. No. 928,270, Nov. 6, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 417,272

Int. Cl.[5] B32B *31/12*; B44F *9/04*

U.S. Cl. 156—61 **11 Claims**



1. A method of fabricating an artificial stone-like facing as for attachment to a substrate, that comprises, preparing a mixture of a wet, soft and uncured synthetic resin binder, color pigment and filler particles and curing agent for the resin, for ultimate attachment to a permanent substrate; applying the mixture to a temporary substrate, presenting a wet surface of irregular and uneven particles; successively and continuously pressing together by rolling pressure successive adjacent portions of the irregular and uneven surface of the wet, soft and uncured resin mixture against the temporary substrate into a flat surface and maintaining the mixture in a cooled condition, as by refrigeration, to inhibit curing and keeping the same soft and uncured until removed from such cooling for application to a permanent substrate.

2. A method as claimed in claim 1 and in which, upon removal from said cooling, the mixture is applied to the said permanent substrate, is rolled there against and thereafter permitted to cure by the action of said curing agent.

4,956,031

METHOD OF MANUFACTURING AN ELONGATED ELECTROLUMINESCENCE ELEMENT

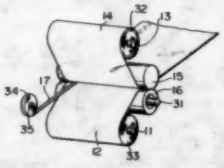
Kiju Mori, Tokyo, and Nobuhisa Kanemitsu, Kanagawa, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Feb. 23, 1989, Ser. No. 314,034

Claims priority, application Japan, Mar. 5, 1988, 63-52326

Int. Cl.[5] B32B *31/08*

U.S. Cl. 156—67 **12 Claims**



1. A method of manufacturing an elongated EL element, comprising the steps of:

preparing a substrate in the form of a continuous web having a back electrode, an insulating layer and a luminescent layer which are superimposed upon each other with said insulating layer positioned between said back electrode and said luminescent layer, a transparent conductive film in the form of a continuous web, and an auxiliary electrode having a width narrower, than that of each of said substrate and said transparent conductive film, said auxiliary electrode being in the form of a continuous tape having and insulating film, an conductive metal layer and a conductive adhesion layer which are superimposed upon each other with said conductive metal layer positioned

between said insulating film and said conductive adhesive layer;

superimposing said substrate and said transparent conductive film one upon the other with their respective longitudinal axes extending parallel to each other, while sandwiching said auxiliary electrode between said substrate and said transparent conductive film such that said auxiliary electrode extends longitudinally of said substrate and said transparent conductive film, wherein said luminescent layer of said substrate is in contact with said transparent conductive film, and wherein said insulating film of said auxiliary electrode is in contact with said luminescent layer of said substrate, while said conductive adhesive layer of said auxiliary electrode is in contact with said transparent conductive film;

applying heat and pressure to the superimposed substrate and transparent conductive film with said auxiliary electrode sandwiched therebetween, to thermocompression-bond the superimposed substrate and transparent conductive film to each other and to bond said conductive adhesive layer of said auxiliary electrode to said transparent conductive film;

covering an assembly of said substrate, said transparent conductive film and said auxiliary electrode with dampproof film material in a sealed fashion; and

cutting said assembly covered with said dampproof film material, into predetermined length to form the elongated EL element.

4,956,032

METHOD OF GROUTING USING A VACUUM

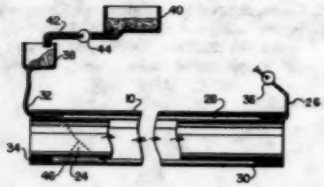
Paul Hahn, and James Allan, both of Collingwood, Canada, assignors to Keller Industries Ltd., Collingwood, Canada

Filed Apr. 19, 1989, Ser. No. 340,494

Claims priority, application Canada, Apr. 28, 1988, 565407

Int. Cl.[5] B32B *31/06, 35/00;* **E03F** *3/06;* **F16L** *55/165*

U.S. Cl. 156—94 **10 Claims**



1. A method of filling an annular space between inner and outer coaxially arranged pipes while maintaining fluid flow through said inner pipe, wherein the outer pipe is an existing pipe and said inner pipe is a relatively thin walled pipe, comprising the steps of:

establishing said fluid flow through said inner pipe;

installing first and second seals at first and second ends, respectively, of said inner pipe between said inner pipe and said outer pipe to form said annular space;

inserting a first end of a vacuum tube into said annular space through said first seal at the high point in said first seal;

inserting a first end of a grout tube into said annular space through said second seal at the high point in said second seal;

applying a vacuum to a second end of said vacuum tube;

applying a grout mixture to a second end of said grout tube; and

maintaining sufficient vacuum within said annular space for such a time period to draw said grout mixture from said second end to said first end of said inner pipe to thereby completely fill said annular space with said grout mixture.

4,956,033

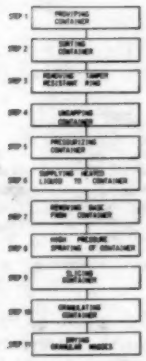
PROCESS FOR RECLAIMING PLASTIC CONTAINERS

Norman R. Martin, 54 Rose Brier Dr., Rochester Hills, Mich. 48309, and Barclay J. McMullen, Bloomfield Hills, Mich., assignors to Norman R. Martin, Rochester Hills, Mich.

Filed May 22, 1989, Ser. No. 355,278

Int. Cl.[5] B32B *35/00, 31/18*

U.S. Cl. 156—94 **15 Claims**



1. A process for reclaiming plastic containers, comprising the steps of:

(a) providing used containers or containers which do not pass quality control standards at manufacture having an adhesive composition affixed thereto;

(b) sorting said containers according to volume;

(c) removing a tamper resistant ring from said container, if required;

(d) uncapping said container, if required;

(e) internally pressurizing said container from about 18 pounds per square inch to about 40 pounds per square inch;

(f) adding at least one ounce of heated liquid into said container for liquefying residue within said container and for loosening an adhesive composition affixed to said container;

(g) allowing said container to depressurize;

(h) removing a base from said container, if required;

(i) removing a label from said container, if required, by external spraying;

(j) removing said liquid from said container;

(k) granulating said container thereby forming granular masses; and

(l) removing excess liquid from said granular masses.

4,956,034

METHOD AND APPARATUS FOR MANUFACTURING LAMINATED GLASS

Kazushi Shinozaki, and Shingo Seki, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Nov. 30, 1988, Ser. No. 278,951

Claims priority, application Japan, Nov. 30, 1987, 62-303033; Nov. 30, 1987, 62-182422[U]; Jul. 8, 1988, 63-170097; Jul. 8, 1988, 63-170096

Int. Cl.[5] B32B *31/12*

U.S. Cl. 156—102 **21 Claims**

1. A method of manufacturing a laminated glass, comprising the steps of:

automatically removing intermediate films, one at a time, from an intermediate film stack successively from an uppermost intermediate film position on the intermediate film stack;

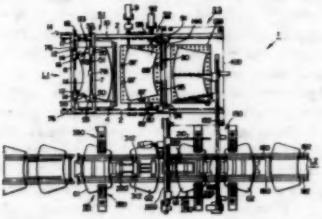
positioning the removed intermediate film;

cutting the positioned intermediate film to a prescribed shape;

positioning one of two curved glass sheets which has a convex side facing up;

transferring said intermediate film over the convex side of said positioned one of the curved glass sheets;

simultaneously positioning said one glass sheet over which said intermediate film has been transferred and the other



glass sheet of said two glass sheets, and superposing said glass sheets one on the other with the intermediate film interposed therebetween;

positioning said other glass sheet above said one glass sheet;

lifting said one glass sheet toward said other glass sheet; and

holding said one glass sheet against the lower surface of said other glass sheet with said intermediate film interposed therebetween, thereby superposing said glass sheets one on the other.

4,956,035

COMPOSITION AND PROCESS FOR PROMOTING ADHESION ON METAL SURFACES

Rudolf P. Sedlak, Palo Alto, Calif., assignor to RD Chemical Company, Mountain View, Calif.

Filed Aug. 1, 1989, Ser. No. 388,337

Int. Cl.[5] C23F *1/00*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—664 **10 Claims**

8. A process for improving the adhesion of organic compounds to metal surfaces, said process comprising:

contacting said metal surface with a composition comprising an aqueous etching composition, an effective amount of a quaternary ammonium cationic surfactant, and a solubilizing amount of a secondary surfactant; and

rinsing said metal surface with water.

4,956,036

METHOD OF MAKING A POWER TRANSMISSION BELT INCLUDING MOISTURIZING AND GRINDING

Douglas R. Sedlacek, Englewood, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 122,989, Nov. 19, 1987, Pat. No. 4,798,566. This application Sep. 15, 1988, Ser. No. 244,364

Int. Cl.[5] B29C *67/14*

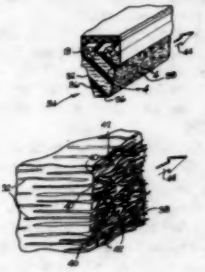
U.S. Cl. 156—137 **6 Claims**

1. In a method of making an elastomeric rubber-type power transmission belt with an embedded load carrying section and an elastomeric layer having dispersed discontinuous fiber oriented transversely of the belt by grinding the elastomeric layer and forming oppositely facing friction driving surfaces, the improvement comprising the steps of:

dispersing discontinuous fiber in the elastomeric layer to a fiber loading from about 1 to about 6 percent by volume, the fiber having a greige tensile modulus sufficient to inhibit the fiber from being severed during grinding;

forming oppositely facing friction driving surfaces while moisturizing with a liquid and grinding elastomer away and leaving portions of fiber protruding from the oppositely facing driving surfaces;

said grinding bending a majority of protruding fiber portions and exposing lateral side portions of fiber; and establishing



part of the friction driving surfaces with the lateral side portions of fiber.

4,956,037

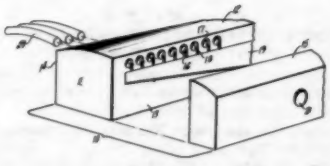
COOLED OPTICAL COMPONENT MANUFACTURE

Alexander M. Vivaldi, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 25, 1988, Ser. No. 275,838

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—155 **5 Claims**



1. A method of manufacturing an optical component having a plurality of cooling channels in a surface region underlying an effective surface thereof, comprising the steps of

forming a precursor of the optical component consisting of a main body which carries the effective surface, and a plurality of solid fugitive material cores embedded in the main body at the desired locations of the cooling channels; and

converting the precursor into the optical component, including consolidating the main body, removing the cores from the cooling channels, and producing respective input and output manifolds at surface zones of the main body that are spaced from the effective surface and onto which respective input and output ends of the cooling channels open, including forming the input and output manifolds in the respective surface zones, and bonding at least one cover plate to the main body subsequently to said forming step such as to sealingly separate the input and output manifolds from the exterior of the optical component at the interface between the main body and the cover plate.

4,956,038

METHOD FOR LINING PIPE LINES

Akio Morinaga, Fujisawa; Masakatsu Hyodo, Takatsuki; Tomiyo Nishimoto, Mishima; Hiroyuki Sakuragi, Kobe, and Shinji Onishi, Takarazuka, all of Japan, assignors to Tokyo Gas Kabushiki Kaisha, Tokyo and Ashimori Kogyo Kabushiki Kaisha, Osaka, both of, Japan

Continuation of Ser. No. 110,706, Oct. 8, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,908

Claims priority, application Japan, Feb. 12, 1986, 61-28158; Feb. 12, 1986, 61-28159; Feb. 12, 1986, 61-28160

Int. Cl.[5] B29C *63/36, 65/54*

U.S. Cl. 156—156 **2 Claims**

1. A method for lining the inner surface of a pipe line laid in a body of water which comprises providing a pipe line to be lined in a body of water, providing a flexible tubular lining material to be evaginated into an interior space of said pipe line, pushing said flexible tubular lining material forward under a fluid pressure into said interior space of said pipe line evaginating said lining material and forming an evaginated inner surface, said tubular lining material being provided with a water-curable binder on said evaginated inner surface thereof, said binder having the property of being capable of reacting with water to initiate curing, advancing said flexible tubular lining material within said interior space of said pipe line continuously turning said lining material inside out under said fluid pressure creating a turning portion of said lining material as said lining material advances through said interior space of said pipe line, said pipe line in advance of said turning portion of said tubular lining material being continuously filled with water due to the immersion of said pipe line in said body of water, said binder reacting with said water within said pipe line to cure and bond said evaginated surface of said lining material onto said inner surface of said pipe line.

4,956,039

METHOD OF MANUFACTURING A CABLE-LIKE PLASTIC COMPOSITE BODY

John Olesen, and Jorgen Jorgensen, both of Frederikshavn, Denmark, assignors to Roblon A/S, Frederikshavn, Denmark

Filed May 10, 1988, Ser. No. 192,356

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715681

Int. Cl.[5] B29C *47/02*; B32B *17/04*; G02B *6/44*

U.S. Cl. 156—180 **10 Claims**

1. A method of manufacturing a high strength cable-like plastic composite support body resistant to kinking, said support body having a longitudinal axis, the method comprising the steps of gathering together a plurality of substantially endless filaments of high modulus of elasticity into a core string so that said filaments in said core string extend parallel to one another in the direction of said longitudinal axis, impregnating said core string throughout its length with a hot melt adhesive which can be made liquid by heating and winding said core string impregnated with said hot melt adhesive with a high strength yarn while said hot melt adhesive is in a soft state to form a wound core string.

4,956,040

METHOD OF ADHERING HOLOGRAMS TO TEXTILE WEARING APPAREL

David Fry, Creve Coeur, Md., assignor to Diversified Graphics, Ltd., Hazelwood, Mo.

Filed Jul. 1, 1988, Ser. No. 214,396

Int. Cl.[5] B32B *31/00*; A47G *1/12*

U.S. Cl. 156—267 **4 Claims**

1. A method for adhering holograms to textile wearing apparel comprising the steps of:

(a) laminating a precut hologram having an upper surface and a lower surface between a clear polyester coating on the upper surface of said hologram and an adhesive skrim backing on the lower surface of said hologram to envelope the hologram and protect it from moisture and scuffing, said polyester coating being sealed to said adhesive skrim backing around margins of said backing extending outwardly from said hologram and said adhesive skrim backing being adapted to adhere said hologram to textile wearing apparel;

(b) cutting said margins away from the resulting laminated hologram to form an enveloped hologram; and

(c) applying the enveloped hologram to textile wearing apparel at a temperature of approximately 270° F. to 300° F. and under a pressure of approximately 30 to 50 psi for a period of approximately 8 to 15 seconds whereby said hologram becomes firmly adhered to said textile wearing apparel.

4,956,041

METHOD OF LINING BRANCH PIPE PORTION OF UNDERGROUND MAIN PIPE WITH RIGID PLASTICS TUBE

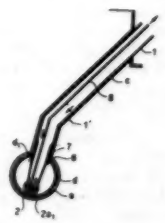
Yasuo Miyazaki, Osaka; Akira Kamide, Higashiosaka, and Shigeki Watari, Osaka, all of Japan, assignors to Osaka Bousui Construction Co., Ltd., Osaka, Japan

Filed Dec. 23, 1988, Ser. No. 288,832

Claims priority, application Japan, Dec. 28, 1987, 62-332471; Feb. 9, 1988, 63-28437

Int. Cl.[5] B29C *63/26*

U.S. Cl. 156—267 **4 Claims**



1. A method of forming a plastic tube lining over an inner surface of a branch pipe connected to an underground main pipe at one end thereof with the other end open to the surface of the ground, the method comprising the steps of:

preparing a rigid plastic tube to be used as a liner, the rigid plastic tube having a discharge means comprising a front plug at a distal end thereof for discharging a fluid therethrough;

inserting the rigid plastic tube equipped with the discharge means through said other end until at least the discharge means extends into the underground main pipe;

feeding a heated and pressurized fluid continuously into the rigid plastic tube in order to radially expand the rigid plastic tube until the rigid plastic tube contacts the inside of the branch pipe while discharging the used fluid out of the rigid plastic tube through the discharge means; and

cutting off a part of the rigid plastic tube within the underground main pipe;

wherein the front plug at said distal end of said rigid plastic tube has an elongated discharge pipe connected thereto and extending along the branch pipe from said front plug to said other end of said branch pipe.

4,956,042

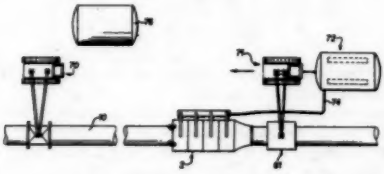
PROCESS AND APPARATUS FOR EMBRITTLING AND SUBSEQUENTLY REMOVING AN OUTER PROTECTIVE COATING OF A PIPE OR PIPELINE

Jean-Luc Hubert, Willowbrook, Ill.; Joseph M. Chitty, Lake Charles, and William A. Ellett, Monroe, both of La., assignors to Liquid Air Corporation, Walnut Creek, Calif.

Filed Nov. 1, 1988, Ser. No. 265,772

Int. Cl.[5] B32B *31/18, 31/22*

U.S. Cl. 156—344 **31 Claims**



1. A process for embrittling and subsequently removing an outer protective coating of at least a pipe section of a transmission pipeline, comprising the steps of:

enclosing a portion of the pipe in a tunnel means so as to define an annular space around said protective coating;

expanding a pressurized liquid nitrogen cryogen into said space in such a way as to embrittle the protective coating by deposition of a layer of liquid nitrogen droplets onto the coated surface of the pipe; and

maintaining said tunnel means in surrounding relationship to said portion of the pipe for a certain time sufficient for said portion of the pipe and the protective coating on said portion of the pipe to fall below en embrittlement temperature for the protective coating.

4,956,043

DRY ETCHING APPARATUS

Masafumi Kanetomo, Suginami; Shinichi Tachi, Sayama; Kazunori Tsujimoto, Higashiyamato; Kiichiro Mukai, Hachioji; Takahiro Deikoku, Ushiku; Shigekazu Kieda, Nilhari; Keijiro Shindo, Musashimurayama, and Kenshiro Tamura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 10, 1988, Ser. No. 192,178

Claims priority, application Japan, May 25, 1987, 62-125809; Aug. 10, 1987, 62-198080

Int. Cl.[5] B44C *1/22*; H01L *21/306*; C03C *15/00*

U.S. Cl. 156—345 **22 Claims**

1. A dry etching apparatus comprising:

a reaction chamber;

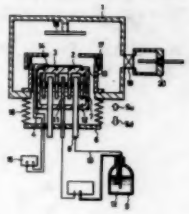
a means for introducing an etching gas into said reaction chamber,

a means for discharging the gas from the interior of said reaction chamber to the outside thereof,

a means for generating plasma of said etching gas in the interior of said reaction chamber,

a wafer table on which an article to be etched is placed,

a means for controlling the temperature of said article to a desired level, said means for controlling the temperature including means for cooling said article, said means for cooling being capable of cooling said article to at least as low as 0° C. and including a liquefied gas, said means for controlling the temperature further including means for heating said wafer table; and



a means for regulating the height of said liquefied gas to a desired level in relation to said wafer table.

4,956,044

TAB SURFACE-PROTECTIVE PAPER SEPARATING DEVICE

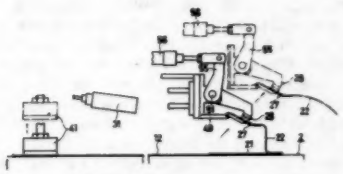
Takemi Watanabe, Toyonaka, and Noriyuki Shiba, Tokyo, both of Japan, assignors to Kabushiki Kaisha Kaneda Kikai Seisakusho, Osaka, Japan

Filed Feb. 28, 1989, Ser. No. 316,904

Claims priority, application Japan, Mar. 3, 1988, 63-28658

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—350 **3 Claims**



1. A device for separating a protective paper from a tab, said protective paper being adhesively attached to the tab except at non-adhesive regions along the edges of the tab, and said tab being attached to the leading web end of a paper roll said device comprising:

a table board onto which said tab and leading web end of said paper roll are brought;

a scraper having blade means;

means for inserting said blade means between said protective paper and said tab at said non-adhesive regions;

a gripping claw;

means for moving said gripping claw in coordination with movement of said scraper to grip said protective paper between said gripping claw and said blade means while said blade means are inserted at said non-adhesive regions;

means for moving said gripping claw and said scraper away from said table board while said protective paper is gripped between said gripping claw and said blade means, whereby said protective paper is removed from said tab;

detection means operable as said gripping claw and said scraper are moved away from said table board for detecting that the protective paper is not gripped between the gripping claw and the blade means, and

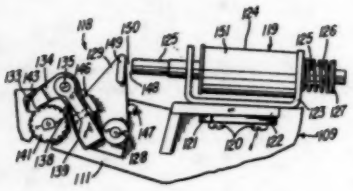
means responsive to said detection means for actuating said means for inserting said blade means and actuating said means for moving said gripping claw.

4,956,045

HAND-HELD LABELER

Brent E. Goodwin, Middletown; Donald L. Karn, Springboro; John D. Mistyurik, Tipp City; John R. Monteith, Dayton; Mark A. Seale, New Carlisle, and David R. Wisecup, Xenia, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Jun. 22, 1988, Ser. No. 209,759
Int. Cl.[5] B65C 11/02
U.S. Cl. 156—384 27 Claims



1. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means for supporting a supply roll of a composite label web, a thermal print head, a platen roll cooperable with the print head for effecting printing on the labels, means for providing a path for the composite label web from the supply roll to between the print head and the platen roll, means for delaminating printed labels from the carrier web, means for applying printed labels means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with the label applying means, and brake means for exerting braking force on the platen roll during application of a printed label to prevent that printed label from pulling composite label web from the supply roll during application of a printed label to avoid misregistration of the next label with respect to the thermal print head and for removing the braking force from the platen roll to enable the carrier web to be advanced by the advancing means.

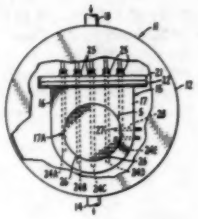
12. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means on the housing for supporting a supply roll of a composite label web, a thermal print head for effecting printing on the labels, means for providing a path for the composite label web from the supply roll to the print head, means for delaminating printed labels from the carrier web, means for applying printed labels, means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with the label applying means, a web-contacting roll for contacting the composite label web, means for applying braking force to the web-contacting roll to prevent a printed label from pulling the composite label web from the label supply roll during application of a printed label to avoid misregistration of the next label with respect to the thermal print head, an electromagnetic device, and means operable by the electromagnetic device only after the electromagnetic device has been energized for a predetermined period of time during which the electromagnetic device develops momentum for disabling the braking force applying means to enable the advancing means to advance the carrier web, wherein the braking force applying means is disabled responsive to the momentum exerted by the electromagnet device.

4,956,046

SEMICONDUCTOR SUBSTRATE TREATING METHOD

Michael A. McNeilly, Palo Alto, Calif., assignor to Advantage Production Technology, Inc., Sunnyvale, Calif.

Division of Ser. No. 919,313, Oct. 15, 1986, Pat. No. 4,778,559.
This application Sep. 29, 1988, Ser. No. 251,108
Int. Cl.[5] C30B 23/02, 25/10; F24H 1/00
U.S. Cl. 156—613 1 Claim



1. A method of treating semiconductor substrates comprising the steps of:

supporting a semiconductor substrate on the obverse surface of a high conductivity member;

maintaining a low melting point, high boiling point metal medium in liquid phase in contact with an area of the reverse surface of the high conductivity member;

heating the low melting point, high boiling point metal medium to a desired liquid temperature;

conducting heat from the liquid metal medium through the high conductivity member to the substrate to heat the substrate to a predetermined temperature; and

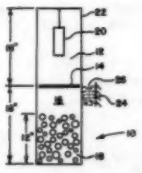
directing reactant materials to said semiconductor substrate.

4,956,047

PROCESS OF MAKING HIGH QUALITY SINGLE QUARTZ CRYSTAL USING SILICA GLASS NUTRIENT

Meckie T. Harris, Nashua, N.H.; John J. Larkin, South Boston, Mass.; Alton F. Armington, Lexington, Mass., and John K. Kennedy, West Roxbury, Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 8, 1988, Ser. No. 229,686
Int. Cl.[5] C30B 7/10
U.S. Cl. 156—623 Q 12 Claims



1. A process of manufacturing ultra high purity quartz crystals, said process comprising the steps of:

a. obtaining silica nutrient having very few impurities therein;

b. providing at least one quartz seed;

c. providing a sealable container having a positionable baffle therein and means for holding said at least one quartz seed, said container, said baffle and said holding means being made of a noble metal, said container being placable in a hydrothermal autoclave;

d. placing the silica nutrient in a nutrient zone being a bottom section of the sealable container;

e. putting a baffle over the nutrient zone and below a seed zone;
f. attaching the at least one seed in the seed zone being in a top section of the container;
g. filling the container with a fluid;
h. sealing the container;
i. placing the sealed container in a chamber of the hydrothermal autoclave;
j. filling the void between the sealed container and the autoclave with a fluid;
k. sealing the autoclave;
l. heating said nutrient zone in a controlled manner;
m. heating said seed zone in a controlled manner, said nutrient zone having a negative temperature gradient to prevent convection transport with respect to said seed zone during an initial heating before crystal growth;
n. growing quartz about the seed wherein the nutrient zone is at a higher temperature than said seed zone, said nutrient zone having a positive temperature gradient to encourage convention transport with respect to said seed zone;
o. cooling the autoclave; and
p. removing at least one quartz crystal from the autoclave.

4,956,048

METHOD OF ALCOHOL WASHING BROWNSTOCK PULP PRIOR TO A CHLORINATION BLEACHING STAGE

Ronnie G. Hise, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Apr. 17, 1989, Ser. No. 338,320
Int. Cl.[5] D21C *9/02, 9/12, 9/14*
U.S. Cl. 162—60 **4 Claims**

1. An improved method of chemical pulping and bleaching comprising bleaching brownstock chemical pulp with a chlorination stage followed by a lignin extraction stage and producing an amount of chlorinated dioxins and furans as a by-product of the bleaching, wherein the improvement comprises reducing the amount of chlorinated dioxins and furans up to at least 80% by washing the pulp with alcohol prior to the chlorination bleaching stage, wherein the alcohol washing does not significantly change the Kappa No. of the chemical pulp.

4,956,049

PROCESS FOR SIZING PAPER WITH ANIONIC HYDROPHOBIC SIZING AGENTS AND CATIONIC RETENTION AIDS

Michael Bernheim, Augsburg; Dieter Strasilla, Weil am Rhein, both of Fed. Rep. of Germany; Bernardo De Sousa, Riehen, and Peter Rohringer, Schönenbuch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 110,896, Oct. 21, 1989, abandoned, which is a continuation of Ser. No. 760,865, Jul. 31, 1989, abandoned. This application Jun. 23, 1989, Ser. No. 372,217
Int. Cl.[5] D21H *17/14*
U.S. Cl. 162—158 **11 Claims**

1. A process for sizing paper or cardboard which comprises treating the fibers thereof with (A) a sizing agent of the formula

$$A_1 - D_1 - (CH_2)_{n-1} - X_1 - R_1$$
$$\qquad\qquad\quad |$$
$$\qquad\qquad (A_2)_{m-1}$$

wherein

A_1 and A_2 are each an anionic carboxyl, hydroxyl or sulfo group which is acidic or in salt form,

D_1 is phenylene, naphthylene, dihydronaphthylene or tetrahydronaphthylene, each of which is unsubstituted or substituted by halogen, nitro, amino or hydroxyl,

R_1 is alkyl or alkenyl, each of 5 to 22 carbon atoms,

X_1 is a bridge of the formula —O—CO—, wherein the terminal —CO— group of said bridge is attached to the alkyl or alkenyl radical R_1, and

m and n are each 1 or 2, and

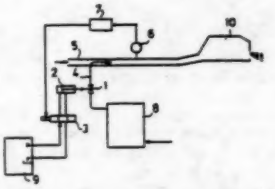
(B) a polyethyleneimine retention aid.—

4,956,050

METHOD FOR ATTENUATION OF THE MACHINE DIRECTION PRESSURE PULSATIONS IN THE HEADBOX IN PAPER AND BOARD MACHINES

Olavi Mäkelä, Kyminlinna, Finland, assignor to Velmet-Ahlstrom Inc., Karhula, Finland

Filed Mar. 13, 1989, Ser. No. 322,697
Claims priority, application Finland, Mar. 28, 1988, 881453
Int. Cl.[5] D21F *1/06*
U.S. Cl. 162—198 **6 Claims**



1. A method of attenuating machine direction pressure pulsations in stock fed into a headbox of a paper machine comprising the steps of:
(a) measuring machine direction pressure pulsations in the stock;
(b) feeding a water flow into the stock;
(c) varying said water flow relative to said pressure pulsations measured in step (a);
(d) controlling the available volume of stock flow by said varying water flow; and
(e) causing pressure variations by said volume variations in said stock flow, said pressure variations being in out-of-phase relation to said machine direction pressure pulsations measured in step (a), thereby attenuating said pulsations primarily in the frequency range of 1 to 50 Hz.

4,956,051

DETACKIFICATION OF ADHESIVE MATERIALS CONTAINED IN SECONDARY FIBER USING POLYVINYL ALCOHOL

Robert D. Moreland, Jacksonville, Fla., assignor to Betz Paper-Chem, Inc., Jacksonville, Fla.

Division of Ser. No. 785,420, Oct. 8, 1985, Pat. No. 4,886,575. This application Jul. 27, 1989, Ser. No. 386,543
The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.
Int. Cl.[5] D21H *21/02*
U.S. Cl. 162—199 **6 Claims**

1. A method of detackifying hot melt and/or pressure sensitive adhesive material contained in a fibrous paper sheet made from waste paper being processed on paper making equipment having felts, wires, and press rolls which are subjected to water sprays and showers which comprises adding to the water spray or shower for spraying onto the felts, wires and press rolls a

sufficient amount for the purpose and in the range of 0.5 to about 30 ppm of a polymer comprised of moieties of polyvinyl alcohol, which polymer contains at least some hydrophobic groups and is water soluble.

4,956,052

PROCESS FOR SEPARATION USING SUPERCRITICAL FLUID

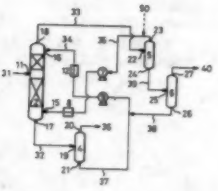
Mitsubo Hirata, Tokyo; Takeshi Ishikawa, Yokohama, and Hiroshi Shiraishi, Tokyo, all of Japan, assignors to Suntory Limited, Osaka, Japan

Continuation of Ser. No. 19,657, Feb. 27, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 407,704

Claims priority, application Japan, Feb. 28, 1986, 61-41490

Int. Cl.[5] B01D *3/34, 11/00;* **C07C** *29/86*

U.S. Cl. 203—19 **29 Claims**



1. A process for separating a mixture of an organic compound and water, comprising the steps of:

providing a supercritical fluid extractant which extracts the organic compound from the mixture, and an extraction aid having a stronger affinity for the water than for said organic compound;

feeding said mixture, said extractant and said extraction aid into an extractor so as to bring said mixture into contact with said extractant and said extraction aid;

extracting said organic compound with said extractant to separate said organic compound from said water mixed with said extraction aid; and

separating said organic compound from said extractant.

4,956,053

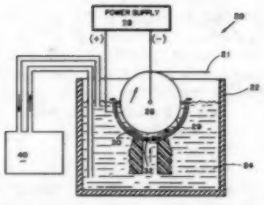
APPARATUS AND PROCESS FOR THE PRODUCTION OF MICRO-PORE FREE HIGH DUCTILITY METAL FOIL

Ned W. Polan, Madison; Raymond J. Smialek, Cheshire, and Paul Menkin, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 199,406, May 26, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 410,770

Int. Cl.[5] C25D *1/04*

U.S. Cl. 204—13 **16 Claims**



1. An essentially micro-pore free and inclusion free electrodeposited copper foil characterized by having no more than one micro-pore having an area greater than or equal to about 5×10^{-8} mm^2 present in an area of 1×10^{-5} mm^2 when observed at a magnification of at least 6000x.

4,956,054

METHOD AND APPARATUS FOR REMOVING CARBON ANODES IN ALUMINUM ELECTROLYSIS CELLS

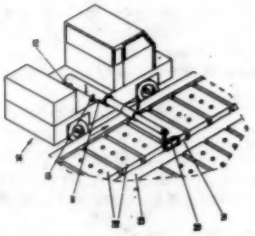
Kjartan Dronnesund, Ardalstangen, and Heggo Stale, Ovre Ardal, both of Norway, assignors to Norsk Hydro a.s., Oslo, Norway

Filed Jan. 11, 1989, Ser. No. 295,791

Claims priority, application Norway, Jan. 12, 1988, 880100

Int. Cl.[5] C25C *3/06, 3/14*

U.S. Cl. 204—67 **20 Claims**



16. A method for cutting crust about an anode in an aluminum production electrolysis cell, comprising the steps of:

(A) providing a movable base, an elongated arm connected to said base near a first end of said arm and having a longitudinal axis extending essentially horizontally, said arm being extensible and contractable along said longitudinal axis, means connected to said arm for raising and lowering said arm with respect to said base within a substantially vertical plane, a fixed share mounted at a free second end of said arm for rotation with respect to said arm about a substantially vertical axis, and means for rotating said share with respect to said arm about said vertical axis;

(B) moving said base to place said arm near a first longitudinal side of the anode;

(C) rotating said share about said vertical axis until said cutting edge extends substantially perpendicular to said longitudinal axis, and extending said arm until said cutting edge is near a transverse side of the anode;

(D) lowering said share until at least a portion of said cutting edge extends through the crust, whereby a transverse cut is formed, and thereafter raising said share until said cutting edge is above said crust;

(E) rotating said share about said vertical axis until said cutting edge extends substantially parallel to said longitudinal axis;

(F) lowering said arm until at least a portion of said cutting edge extends through the crust;

(G) extending or retracting said arm as required to move said share from the current transverse side of the anode to the other transverse side of the anode, whereby a longitudinal cut is formed, and thereafter raising said arm until said cutting edge is above said crust;

(H) rotating said share about said vertical axis until said cutting edge is substantially perpendicular to said longitudinal axis;

(I) repeating step (D);

(J) moving said base means to place said arm near a second longitudinal side of the anode; and

(K) repearing steps (E)–(G).

4,956,055

PREPARATION OF BIDENTATE LIGANDS

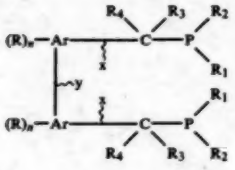
Thomas A. Puckette, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 118,573, Nov. 9, 1987, Pat. No. 4,879,008. This application Jul. 24, 1989, Ser. No. 383,696

Int. Cl.[5] C25C 3/00

U.S. Cl. 204—72 **13 Claims**

1. A process for preparing a bidentate ligand of the formula:



wherein:

each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;

the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;

each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, carboxyl, cyano or formyl radicals;

n is a whole number in the range of 0–4 where Ar is phenyl; 0–6 where Ar is naphthyl; and 0–8 where Ar is phenanthryl or anthracenyl;

each R_1 and R_2 is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals, or substituted derivatives thereof, wherein substituted derivatives are selected from ethers, amines, amines, sulfonic acids, esters, hydroxyl groups or alkoxy groups;

each R_3 and R_4 is independently selected from hydrogen and the R_1 substituents;

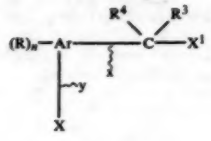
each of the above alkyl groups or moieties is a straight or branched chain of 1–20 carbons;

each aryl group contains 6–10 ring carbons;

each cycloaliphatic group contains from 4–8 ring carbons; and

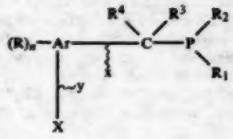
said process comprising:

(i) contacting an aromatic compound of the formula:



with a compound of the formula:

wherein X=halogen, X^1=halogen or a suitable leaving group and M'=Li, Na, K, Mg, Ca, Zn or Cd under conditions suitable to form a reactant of the formula:



then

(ii) maintaining a redox reaction system comprising

(a) said reactant,

(b) a polar, aprotic solvent,

(c) a nickel compound, and

(d) a reducing agent, which has a sufficient reducing potential to promote the reduction of Ni(II) to Ni(O), at a temperature and for a time sufficient to form said ligand.

12. The process of claim 1 wherein the reducing agent is an electrolytic cell.

4,956,056

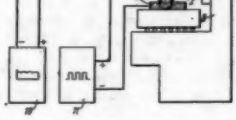
METHOD OF ABRASIVE ELECTROEROSION GRINDING

Lidia S. Zubatova, Ljublinskaya, 111, kv. 120; Eduard Y. Grodzinsky, ulitsa Maril Ulyanovoi, 11, kv. 117; Ivan V. Shelyagin, Volgo-gradsky prospekt, 147/5, Korpus 1, kv. 60, and Alexandr A. Zaitsev, Ulitsa Rogozhsky val, 7/1, kv. 108, all of, Moscow, U.S.S.R.

Filed Mar. 20, 1989, Ser. No. 326,882

Int. Cl.[5] B23H 5/04, 5/08, 7/12

U.S. Cl. 204—129.43 **4 Claims**



1. A method of abrasive electroerosion grinding with the aid of a metallic-bond abrasive wheel and a coolant having a conductivity of from $2 \cdot 10^{-3}$ to $2 \cdot 10^{-2}$ ohm^{-1} cm^{-1}, comprising the steps of:

applying a pulse voltage to said wheel in a zone of grinding;

arranging an electrode adapted to produce an additional electric effect on said wheel out of said zone of grinding of said workpiece;

creating an interelectrode space betwen the electrode and wheel for a coolant to be supplied thereinto;

applying a rectified voltage having an amplitude and a ripple factor to said electrode and wheel, which ensures formation of an insulating oxide film on the surface of said wheel.

4,956,057

PROCESS FOR COMPLETE REMOVAL OF NITRITES AND NITRATES FROM AN AQUEOUS SOLUTION

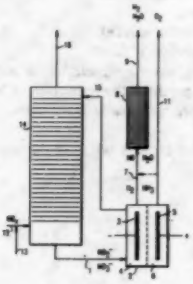
Samuel Stucki, Nussbaumen, Switzerland, and Dieter Winkler, Lauchringen, Fed. Rep. of Germany, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Oct. 13, 1989, Ser. No. 420,954

Claims priority, application Switzerland, Oct. 21, 1988, 3927/88

Int. Cl.[5] C25B *1/00*

U.S. Cl. 204—101 3 Claims



1. A process for complete removal of nitrites and nitrates from an aqueous solution (1) by means of electrolysis, which comprises: providing an electrolysis cell containing a cathode, a cathode space, an anode, and an anode space; feeding the aqueous solution (1), loaded with salts, nitrites, and nitrates, to the cathode space (4) of the electrolysis cell (2); electrolytically producing gas at the anode and the cathode; passing the gas (7), formed by electrolytic reduction at the cathode (3) and containing H_2, NH_3, NO and N_2O, through a catalyst bed (8) for reaction, producing in this way the non-toxic substances N_2 and H_2O as the reaction products (9); and taking off the aqueous solution (10), still containing non-participating residual salts, from the anode space (6).

3. A process for the removal of nitrites and nitrates from an aqueous solution of a wet-absorption vessel for a crude NO_x-rich waste gas (12) containing nitric oxide, the aqueous solution used being an aqueous alkaline solution (15) of NaOH or KOH, which comprises: providing an electrolysis cell containing a cathode, a cathode space, an anode, and an anode space feeding; the aqueous solution (1), loaded with nitrites and nitrates, as a rich solution to the cathode space (4) of the electrolysis cell (2); electrolytically freeing the aqueous solution at least partially from the nitrites and nitrates electrolytically producing gas at the cathode; recycling the aqueous solution as a lean solution to the wet-absorption vessel (14) for NO_2; and catalytically reacting the gas, formed by electrolytic reduction at the cathode (3), with one another to form N_2 and H_2O.

4,956,058

SCROLL TYPE FLUID DISPLACEMENT APPARATUS WITH SURFACE TREATED SPIRAL ELEMENT

Fumiyoshi Saito, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Mar. 12, 1984, Ser. No. 588,564

Claims priority, application Japan, Mar. 15, 1983, 58-36340[U]

Int. Cl.[5] B05D *3/10*; B23H *5/04, 9/00*

U.S. Cl. 204—129.35 2 Claims

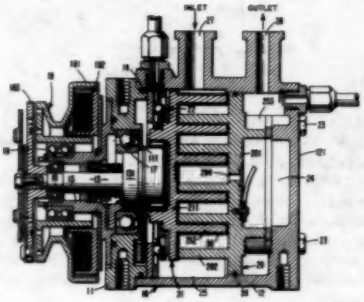
1. In a scroll type fluid displacement apparatus including fixed and orbiting scrolls formed of aluminum or aluminum alloy, each of said scrolls comprising an end plate and a spiral wrap extending from one side of said end plate, said spiral wraps interfitting at an angular and radial offset to make a plurality of line contacts which define at least one pair of sealed off fluid pockets, driving means operatively connected to said orbiting scroll for orbiting said orbiting scroll relative to said fixed scroll while preventing rotation of said orbiting scroll to thereby change the volume of the fluid pockets, a method for reducing the frictional wear between the contact surfaces of said scrolls, said method comprising the steps of:

mechanically finishing the contact surface of at least one of said scrolls to provide a smooth surface; and

treating said smooth surface with alumite,

wherein said step of mechanically finishing the contact surface of at least one of said scrolls to provide a smooth surface is performed by electrolytic polishing.

2. In a scroll type fluid displacement apparatus including fixed and orbiting scrolls formed of aluminum or aluminum alloy, each of said scrolls comprising an end plate and a spiral



wrap extending from one side of said end plate, said spiral wraps interfitting at an angular and radial offset to make a plurality of line contacts which define at least one pair of sealed off fluid pockets, driving means operatively connected to said orbiting scroll for orbiting said orbiting scroll relative to said fixed scroll while preventing rotation of said orbiting scroll to thereby change the volume of the fluid pockets, a method for reducing the frictional wear between the contact surfaces of said scrolls, said method comprising the steps of:

mechanically finishing the contact surface of at least one of said scrolls to provide a smooth surface; and

treating said smooth surface with alumite,

wherein said step of mechanically finishing the contact surface of at least one of said scrolls to provide a smooth surface is performed by chemical polishing.

4,956,059

PROCESS FOR THE PURIFICATION OF GRANULAR SILICON DIOXIDE

Wolfgang Englisch, Kelkheim; Helmut Leber, Hanau; Klaus Reimann, Rodenbach, and Fritz Simmat, Gelnhausen, all of Fed. Rep. of Germany, assignors to Heraeus Quarzschmelze GmbH, Hanau, Fed. Rep. of Germany

Filed Sep. 21, 1989, Ser. No. 410,581

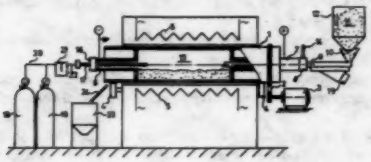
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1988, 3836934

Int. Cl.[5] C25F *5/00*; C01B *33/12*

U.S. Cl. 204—130 10 Claims

1. Process for removing alkali impurities from granular crystalline or amorphous silicon dioxide particles in a chamber at temperatures ranging between 700 and 1,300° C. while a gaseous atmosphere of chlorine and/or hydrogen chloride is passed through the chamber and the silicon dioxide particles are thoroughly mixed wherein silicon dioxide grains are thoroughly mixed in the chamber during a mixing period, during which mixing period said gaseous atmosphere is passed through said chamber, than subsequently, during a resting period which is greater than the mixing period by one order of magnitude, exposing the particles, in the chamber, to a con-

stant electric field having a strength ranging between 600 and 1,350 V/cm and this procedure is repeated several times during



a retention time of at least 120 minutes of the silicon dioxide grains in the chamber.

4,956,060

FINISHING METHOD EMPLOYING ELECTRO-CHEMICAL MACHINING, AND AN ELECTRO-CHEMICAL FINISHING MACHINE

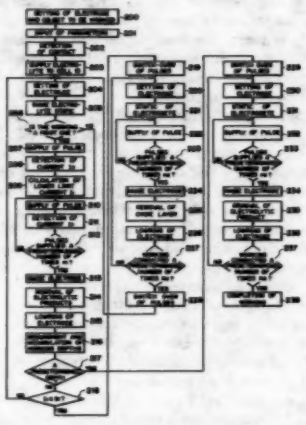
Yohei Kuwabara, Fukuroi; Teruo Asaoka, Kakegawa; Shogo Yoshioka, Iwata, and Haruki Sugiyama, Fukuroi, all of Japan, assignors to Shizuoka Seiki Co., Ltd., Shizuoka, Japan

Filed Dec. 23, 1988, Ser. No. 290,243

Claims priority, application Japan, Jan. 11, 1988, 63-4040

Int. Cl.[5] B23H *3/02, 9/12*

U.S. Cl. 204—129.2 **10 Claims**



1. A finishing method employing electro-chemical machining, comprising the steps of:

A. supplying a pulse having a selected current density between an electrode and an object to be worked, said electrode and object having thereon respective three-dimensional surfaces of substantially congruent shape which face each other, which are spaced by a substantially uniform interval at all locations thereon, and which have a static electrolyte therebetween;

B. detecting the current of the pulse supplied between said electrode and said object to be worked, and then effecting relative movement of said electrode and said object away from each other, injecting electrolyte between said electrode and said object, and then positioning said electrode relative to said object so that said three-dimensional surfaces have said uniform interval therebetween;

C. comparing the detected current with a current set in advance in accordance with properties of said object to be worked, and increasing or decreasing said selected current density on the basis of the result of said comparison;

D. supplying pulses having said increased or decreased selected current density between said electrode and said object to be worked a predetermined number of times;

E. effecting relative movement of said electrode and said object away from each other, removing electrolytic products generated between said electrode and said object to be worked by injecting electrolyte between said electrode and said object, and then positioning said electrode relative to said object so that said three-dimensional surfaces have said uniform interval therebetween; and

F. repeating said steps A through E.

4,956,061

PRODUCTION OF HALOGENS BY ELECTROLYSIS OF ALKALI METAL HALIDES IN AN ELECTROLYSIS CELL HAVING CATALYTIC ELECTRODES BONDED TO THE SURFACE OF A SOLID POLYMER ELECTROLYTE MEMBRANE

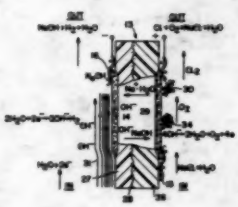
Russell M. Dempsey, Hamilton; Thomas G. Coker, Waltham; Anthony B. LaConti, Lynnfield, and Anthony R. Fragala, North Andover, all of Mass., assignors to Oronzio de Nora Permelec S.p.A., Milan, Italy

Continuation of Ser. No. 153,368, May 27, 1980, Pat. No. 4,772,364, which is a division of Ser. No. 922,316, Jul. 6, 1978, Pat. No. 4,224,121, which is a continuation-in-part of Ser. No. 892,500, Apr. 3, 1978, abandoned, which is a continuation-in-part of Ser. No. 858,959, Dec. 9, 1977, abandoned. This application Jul. 27, 1988, Ser. No. 224,607

The portion of the term of this patent subsequent to Sep. 23, 1997, has been disclaimed.

Int. Cl.[5] C25B *1/26*

U.S. Cl. 204—128 **12 Claims**



1. A method for generating chlorine which comprises electrolyzing an aqueous alkali metal chloride in a cell having an anode and a cathode separated by and in contact with an ion exchange diaphragm which is substantially impermeable to electrolyte flow therethrough wherein at least one of said anode and cathode comprises a mixture of particles of an electroconductive platinum group catalytic material and further includes particles of an electroconductive extender bonded to the membrane, said extender being a material other than a platinum group catalyst; by feeding alkali metal chloride to the anode and water to the cathode and maintaining an electrolyzing potential between said anode and cathode.

4,956,062

METHOD FOR CONCENTRATION DETERMINATION OF LITHIUM IONS

Kenta Ooi, Kagawa; Yoshitaka Miyai, Takamatsu, and Shunsaku Katoh, Kagawa, all of Japan, assignors to Japan as represented by Director General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 14, 1989, Ser. No. 324,040

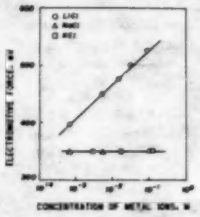
Claims priority, application Japan, Apr. 14, 1988, 63-92600

Int. Cl.[5] G01N *27/333*

U.S. Cl. 204—153.15 **6 Claims**

1. A method for the determination of the concentration of lithium ions in an aqueous medium, which consists essentially of the steps of:

(a) bringing an ion-selective electrode comprising a composite oxide of manganese and lithium having a chemical composition expressed by the formula $Li_xMn_2O_4$, in which the subscript x is a positive number smaller than 1, and a reference electrode into contact with the aqueous medium containing lithium ions; and



(b) measuring the electromotive force generated between the reference electrode and the ion-selective electrode in said aqueous medium, said electromotive force being a function of said concentration of lithium ions.

4,956,063

OZONE MEASURING METHOD

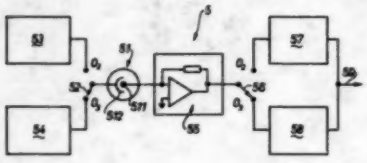
John M. Hale, Meinier, Switzerland, assignor to Orbisphere Laboratories (Inc.), Switzerland

Filed Mar. 28, 1989, Ser. No. 329,679

Claims priority, application European Pat. Off., Mar. 31, 1988, 88810217.5

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—153.17 **4 Claims**



1. An amperometric method for quantitative determination of ozone contained in a fluid; said method comprising the steps of:

(A) providing an amperometric cell having a sensing electrode, a counter electrode, an aqueous electrolyte in contact with said sensing electrode and said counter electrode, and a membrane that is substantially impermeable to said electrolyte but permeable to said ozone for containing said electrolyte within said cell and for separating it from said fluid maintained external to said cell;

(B) providing in said aqueous electrolyte a redox catalyst for chemically transforming said ozone upon its permeation through said membrane into an intermediary electroactive species capable of generating upon reaction with said sensing electrode an indicative electrical signal in proportion with a concentration of said ozone in said fluid;

(C) calibrating said cell by

(i) applying a first voltage to said cell and exposing it to an external calibration fluid that is substantially free of said ozone and contains a known concentration of an electroactive calibration species capable of permeating through said membrane and of reacting at said sensing electrode to obtain a first or calibration signal that is indicative of a first rate P^1 of permeation of said electroactive calibration species into said cell; and

(ii) invoking a factor derived from a previously determined permeation rate P^2 of said ozone and from a previously determined permeation rate P^3 of said electroactive calibration species, both P^2 and P^3 being determined with a membrane having the same characteristics as said membrane used for obtaining said first or calibration signal;

(D) applying a predetermined potential across said sensing electrode and said counter electrode;

(E) measuring a cell current generated by reaction of said intermediary electroactive species with said sensing electrode;

(i) effecting said measuring step by operating said cell while exposed to an external unknown sample at a second voltage capable of causing electrical reaction of said ozone or of said intermediary electroactive species to generate a second or measuring signal; and

(ii) compensating said second signal for temperature effects and for correlation with said factor to obtain an output that is indicative of the concentration of said ozone in said external unknown sample.

3. A method of determining the concentration of a strongly oxidizing or strongly reducing chemical agent in a fluid by means of an amperometric cell comprising a sensing electrode and a counter electrode each having a surface exposed to an aqueous electrolyte which is separated from said fluid by a membrane that is permeable to said strongly oxidizing or strongly reducing agent in said fluid but is substantially impermeable to said aqueous electrolyte; said method comprising the steps of:

(I) effecting a calibration step by applying a first voltage to said cell and exposing it to an external calibration fluid that is substantially free of said strongly oxidizing or strongly reducing chemical agent and contains a known concentration of an electroactive calibration species capable of permeating through said cell and of reacting at said sensing electrode to obtain a first or calibration signal that is indicative of a first rate P^1 of permeation of said electroactive calibration species through said cell;

(II) invoking a factor derived from a previously determined permeation rate P^2 of said strongly oxidizing or strongly reducing chemical agent and from a previously determined permeation rate P^3 of said electroactive calibration species, both P^2 and P^3 being determined with a membrane as used for obtaining said first or calibration signal;

(III) effecting said measuring step by operating said cell while exposed to an external unknown sample at a second voltage capable of causing electrical reaction of said strongly oxidizing or strongly reducing agent, or of an intermediary electroactive species formed by chemical reaction of said agent with said electrolyte to generate a second or measuring signal; and

(IV) compensating said second signal for temperature effects and for correlation with said factor to obtain an output that is indicative of the concentration of said strongly oxidizing or strongly reducing chemical agent in said external unknown sample.

4,956,064

DEHALOGENATION OF HALOGENATED ORGANIC COMPOUNDS

Dennis Evers, Kenmore, and Robin Craig, Helensvale, both of Australia, assignors to Biotox Pty. Ltd., Australia

Continuation of Ser. No. 69,362, Jul. 2, 1987, abandoned. This application May 30, 1989, Ser. No. 358,466

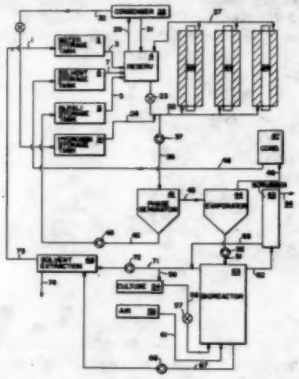
Claims priority, application Australia, Jul. 2, 1986, PH6691; Mar. 4, 1987, P10658

Int. Cl.[5] B01J *19/08*; C12P *1/04*

U.S. Cl. 204—157.94 **19 Claims**

1. A process for degradation of a polyhalogenated organic compound, comprising the steps of admixing an aqueous phase containing a water soluble alkaline material and an organic solvent phase, said solvent phase being miscible with water and containing a polyhalogenated organic compound, maintaining the concentration of said alkaline material at a value suffi-

ciently high to provide a two-phase system, subjecting the two-phase system to ultra-violet irradiation to produce a lesser



halogenated organic compound, and thereafter biologically degrading said lesser halogenated organic compound.

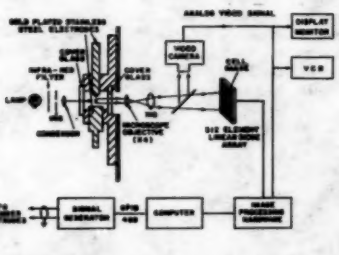
4,956,065
METHOD AND APPARATUS FOR THREE DIMENSIONAL DYNAMIC DIELECTRIC LEVITATION

Karen V. I. S. Kaler, Dept. of Electrical Engineering, University of Calgary, 2500 University Drive, N. W., Calgary, Alberta, Canada T2N 1N4, and Thomas B. Jones, Dept. of Electrical Engineering, University of Rochester, Rochester, N.Y. 14627

Filed Nov. 3, 1988, Ser. No. 267,220

Int. Cl.[5] C12M *1/42*; C12N *13/00*

U.S. Cl. 204—183.1 **8 Claims**



1. A three-dimensional dynamic dielectrophoretic levitation method comprising:

(i) providing a cell suspension in a levitation chamber of a dielectrophoresis apparatus containing a electrode system, said suspension being provided between the electrodes of the system;

(ii) subjecting a cell from said suspension to a non-uniform electric field generated from voltage applied to the electrodes of said electrode system, wherein there is established a non-uniform gradient that is positive along the axis extending between the electrodes and negative in the radial direction, thereby reducing radial migration of the cell;

(iii) dynamically levitating said cell in three-dimensions;

(iv) monitoring the position of the cell; and

(v) providing a focussed cell by maintaining or adjusting the position of the cell by controlling the voltage applied to the electrode system, wherein steps (iv) and (v) are carried out using an active feedback control means, said active feedback control means including an optical means to monitor cell position comprising both a linear diode array and a video camera wherein the diode array is interfaced with a high speed A/D converter and the video camera is interfaced with real time image processing hardware.

4,956,066
DEVICE FOR CARRYING OUT FIELD SUPPORTED ION EXCHANGE IN PLANE-PARALLEL PLATES

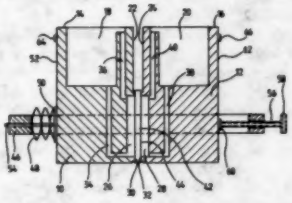
Edilbert A. K. Froning, Am Fohrenbuhle 12, 7777 Salem, and Klaus A. Langner, Alte Dorfstrasse 61, 7777 Uberlingen, both of Fed. Rep. of Germany

Filed Jan. 31, 1989, Ser. No. 304,496

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1988, 3802837

Int. Cl.[5] C03C *21/00*

U.S. Cl. 204—243 R **2 Claims**



1. A device for achieving field-ion exchange between plane-parallel glass plates and molten salts in the process of making optical waveguides, comprising

a pair of holding bodies of electrically conductive material having side faces facing each other, cavities in said side faces, and planar sealing surfaces surrounding said cavities, said holding bodies, in operation being arranged vertically to hold the plane-parallel glass plate therebetween with said sealing surfaces sealing engaging said glass plate on opposite sides thereof,

each of said holding bodies having a substantially horizontal top face with a recess therein open to the top, said recesses being reservoirs adapted to accommodate molten salt, the bottom of said recess being located above the upper end of said cavity,

a filling supply conduit for connecting said recess with said cavity, said filling supply conduit extending from the bottom of said recess to the lower end of said cavity, and

a vent conduit extending from the upper end of said cavity to said top face of said holding body,

said holding bodies being supported through electrically insulating means and being arranged to be connected to the negative and positive terminals, respectively of an electric power source.

4,956,067
MULTI-ROTATING DISK ELECTRODE AND SOLID POLYMER ELECTROLYTE ELECTRODE TYPE ELECTROLYTIC BATH

Kyung S. Yun, and Byung W. Cho, both of Seoul, Rep. of Korea, assignors to Korea Institute of Science and Technology, Seoul, Rep. of Korea

Filed Jan. 4, 1990, Ser. No. 460,986

Claims priority, application Rep. of Korea, Sep. 6, 1989, 12904/1989[U]

Int. Cl.[5] C25B *9/00*

U.S. Cl. 204—212 **8 Claims**

1. A multi-rotating disk electrode and solid polymer electrolyte electrode type electrolytic bath comprising:

a multi-rotating disk electrode (RDE) which is formed by stacking alternately large and small rotating disk electrodes; and

a solid polymer electrolyte (SPE) electrode in which conductive material such as metal is coupled in a single layer or multilayers on a solid polymer electrolyte, both of said multi-RDE and SPE electrode being provided simultaneously as a working electrode.

4,956,068

NON-CONSUMABLE ANODE FOR MOLTEN SALT ELECTROLYSIS

Thinh Nguyen, Onex; Abdelkrim Lazouni, Geneva, and Kim S. Doan, Onex, all of Switzerland, assignors to MOLTECH Invest S.A., Luxembourg

PCT No. PCT/EP88/00787, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/01994, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 30, 1988, Ser. No. 350,477

Claims priority, application Austria, Sep. 2, 1987, 87810503

Int. Cl.[5] C25C *7/02*

U.S. Cl. 204—242 **12 Claims**

1. An anode for electrowinning aluminum from molten salt electrolytes, and which, in use, is a substrate for a coating formed or maintained in-situ in the molten electrolyte, the anode comprising an oxide ceramic coating applied on a metal, alloy or cermet substrate, and an electronically-conductive oxygen barrier layer between the oxide ceramic coating and the substrate, the oxygen barrier layer containing chromium oxide, and the oxide ceramic coating which swerves as anchorage for said in-situ coating comprising copper oxide in solid solution with at least one further oxide; nickel ferrite; copper oxide and nickel ferrite; or doped, non-stoichiometric or partially substituted spinel.

4,956,069

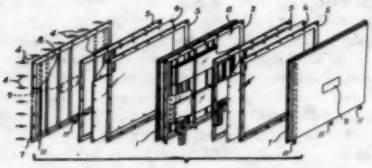
ELECTROLYTIC MEMBRANE CELLS FOR THE PRODUCTION OF ALKALIS

Hermilo Tamez Salazar, Ave. Lagrange 108 Fracc. Colonial Lagrange 66490, San Nicolas, De Los Garza, N. L., Mexico

Filed Mar. 10, 1989, Ser. No. 321,304

Int. Cl.[5] C25B *9/00, 11/03, 11/10*

U.S. Cl. 204—257 **2 Claims**



1. An electrolytic membrane self contained sealed cell for the production of alkalis, comprising in combination,

a central anode compartment located between two cathode compartments to form a monopolar cell structure,

anode compartment structure providing two opposed sheets comprising titanium spread in a layer with reinforcing structure forming a compartment which defines in an upper part a space for accumulation of reaction gases,

cathode compartment structures respectively comprising an outer perforated tin plate and a diaphragm disposed toward said anode sheets respectively,

electrical current terminals respectively connected to the titanium sheets and tin plates,

assembling means holding the sheets and plates in spaced relationship to define a sealed self combined electrolytic cell, and

hydraulic pipe means for introducing raw materials into the cell and removing processed products.

4,956,070

SPUTTERING APPARATUS

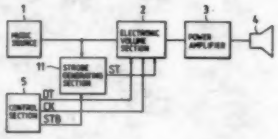
Junji Nakada, and Hideaki Takeuchi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 14, 1989, Ser. No. 338,078

Claims priority, application Japan, Apr. 20, 1988, 63-95430

Int. Cl.[5] C23C *14/35*

U.S. Cl. 204—298.18 **5 Claims**



1. A sputtering apparatus comprising: at least two different kinds of targets; a substrate, onto which sputtering is performed, disposed in opposition to said targets; magnetic field generating means for producing magnetic fields substantially perpendicularly intersecting electric fields generated between said substrate and said targets near front sides of said targets, said magnetic field generating means comprising main magnets for generating said magnetic fields, and respective auxiliary electromagnets provided near said main magnets or combined therewith; and means for supplying electrical currents for exciting said electromagnets and controlling said electrical currents to change the intensity of said magnetic fields to regulate a sputtering discharge, said electrical currents having a sinusoidal waveform with a DC offset.

4,956,071

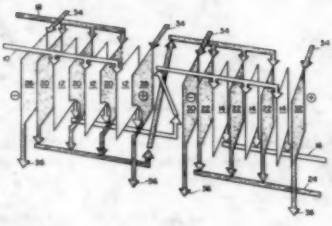
ELECTRODEIONIZATION APPARATUS AND MODULE

Anthony J. Giuffrida, N. Andover; Gary C. Ganzi, Lexington, and Yoram Oren, Brookline, all of Mass., assignors to Millipore Corporation, Bedford, Mass.

Continuation-in-part of Ser. No. 908,913, Sep. 18, 1986, which is a division of Ser. No. 762,804, Aug. 2, 1985, Pat. No. 4,632,745, which is a continuation of Ser. No. 628,930, Jul. 9, 1984, abandoned. This application Jan. 18, 1989, Ser. No. 298,455

Int. Cl.[5] B01D *13/02*

U.S. Cl. 204—301 **14 Claims**



1. Electrodeionization apparatus adapted to remove ions from a liquid which comprises:

a first cathode compartment at a first end of said apparatus,

a first anode compartment at an end of said apparatus that is opposite of said first end,

a plurality of dual compartments comprising an ion depleting compartment, an ion concentrating compartment and an odd number of at least three ion permeable membranes,

said ion permeable membranes comprising anion permeable membranes alternately positioned with respect to cation permeable membranes,

each of said ion depleting compartments and each of said ion concentrating compartments comprising a spacer and a plurality of ion depleting subcompartments and ion concentrating subcompartments,

said subcompartments being formed by a plurality of ribs extending along the length of each of said ion depleting compartments and said ion concentrating compartments,

each of said ion depleting subcompartments and said ion concentrating subcompartments containing a mixture of anion exchange resin and cation exchange resin,

each of said ion depleting subcompartments and said ion concentrating subcompartments having a width defined by the distance between said ribs of between about 0.3 and 4 inches and a thickness between about 0.05 and 0.25 inches wherein the thickness of said subcompartments is defined by the distance between an anion permeable membrane adjacently positioned to a cation permeable membrane, said membranes being bonded to each of said ribs, along the length of said ribs, and to said spacer,

such that the anion permeable membrane and cation permeable membrane are positioned alternatively along the length of said dual compartment,

means for passing a first liquid to be purified through said ion depleting compartments,

means for passing a second liquid for accepting ions from said first liquid through said ion concentrating compartments,

means for supplying an electrical voltage between an anode in said anode compartment and a cathode within said cathode compartment,

means for reversing polarity of said electrical voltage to convert said anode to a second cathode and to convert said cathode to a second anode and to convert said ion depleting compartments to second ion concentrating compartments and to convert said ion concentrating compartments to second ion depleting compartments and,

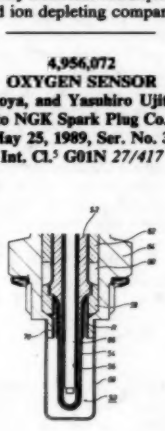
means for recovering a liquid product having low conductivity continuously from said ion depleting, compartments and said second ion depleting compartments.

4,956,072

OXYGEN SENSOR

Takao Kojima, Nagoya, and Yasuhiro Ujita, Kasugai, both of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed May 25, 1989, Ser. No. 356,918
Int. Cl.[5] G01N *27/417*
U.S. Cl. 204—424 **6 Claims**



1. A solid electrolyte oxygen sensor comprising:

a detection element comprising a solid electrolyte and inner and outer electrodes coupled to said solid electrolyte, at least one of which is exposed to the atmosphere, for detecting an oxygen partial pressure for the surrounding atmosphere;

a metal member insulated from the outer electrode of the detection element for containing the detection element;

an insulating spacer provided between the outer electrode of the detection element and the metal member for supporting the detecting element; and

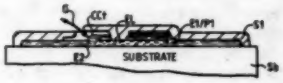
heat-stable insulating layer means covering the surface of a recess defined between the detection element on one side and the metal member and the insulating spacer on the other side for preventing deterioration of insulation between said electrodes and said metal member.

4,956,073

METHOD TO MAKE MICROCAVITIES AND ITS APPLICATION TO AN ELECTROCHEMICAL SENSOR

Didier Pribat, Paris; Joël Perret, Plaisir; Jean-Claude Rouffy, Poissy, and Gonzalo Velasco, Paris, all of France, assignors to Thomson-CSF, Paris, France

Filed Sep. 19, 1988, Ser. No. 245,731
Claims priority, application France, Sep. 22, 1987, 87 13058
Int. Cl.[5] G01N *27*
U.S. Cl. 204—426 **7 Claims**



1. A method for making an electrochemical sensor having a microcavity comprising the steps of:

forming on a substrate at least one element made of solid electrolyte;

partially covering said electrolyte element with a first electrode;

partially covering said electrolyte element with a second electrode;

making, on said second electrode, an element made of a material which is combustible and/or volatile at high temperature and which has the shape, thickness and position of said microcavity to be formed;

making a sheath fully covering said first and second electrodes, said electrolyte element and said element made of combustible and/or volatile material, said sheath being made of an amorphous material which is impervious to a fluid mixture and, for making, in said sheath an axis hole to said element made of combustible and/or volatile materials;

and heating at least said element made of combustible and/or volatile materials so as to cause its evaporation and/or consumption.

6. An electrochemical sensor for the measurement of relative concentrations of species contained in a fluid mixture, made according to the method of claim 1, comprising:

at least one solid electrolyte which is an ion conductor of one of the species of the fluid mixture or of an ion capable of reacting with this species;

at least one first partial pressure internal reference electrode in contact, by one of its faces, entirely or partly, with the solid electrolyte;

at least one second measuring electrode in contact, by one of its faces, entirely or partially, with the solid electrolyte and receiving the fluid mixture to be analyzed;

a layer of an encapsulating material made of an inert material which is impervious to the species present in the fluid mixture, coating the first electrode, the second electrode and the solid electrolyte, and having one access hole enabling the fluid mixture to reach the second electrode;

said electrochemical sensor comprising at least one microcavity partially covering the second measuring electrode in that zone which covers the electrolyte, said microcavity communicating through the access hole with the fluid mixture to be analyzed and having a thickness enabling a diffusion of a molecular type of fluid.

4,956,074

MICROPROBE

Helmut Fischer, Industriestr. 21, 7032 Sindelfingen 6, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 390,238
Int. Cl.[5] G01N 27/26
U.S. Cl. 204—434 22 Claims

1. In an apparatus for a microprobe (3) for coulometric measurement of the thickness of metallic coatings (2), comprising

an outer casing (4) having at one end an outlet orifice (7) for an electrolyte used in coulometric measurement and a first connection (16) for a pressure medium,

an inner casing (6) in the outer casing (4),

a first chamber (11) between the outer casing (4) and the inner casing (6),

a second chamber (12) in the inner casing (6), in a region thereof facing away from the outlet orifice (7),

a second connection (14) for a pressure medium that communicates with the second chamber (12),

a nozzle pipe (8) that leads from the second chamber (12) to the outlet orifice (7) and has a debouchment (43) situated inside the first chamber (11) behind the outlet orifice (7),

first pump means (28, 17, 16) having a connecting coupling (17) connected to at least one of the connections (13, 14) by a pressure medium means (16), which first pump means produces at least indirectly at least one of two different operating pressures, P0 and P1, for at least one of the chambers of which at least one of the operating pressures is oscillating,

second pump means (28, 17, 22) for producing at least indirectly the second of the two different operating pressures P0 and P1 for the other chamber

the improvement wherein:

a valve apparatus (29, 31, 23, 24) is provided between the first and second pump means and the microprobe (3), wherein in a working position of the first and second pump means and the valve apparatus (29, 31, 23, 24) an underpressure P2, which is substantially lower than the maximum operating pressures of P0 and P1, is superimposed on at least one of the operating pressures.

4,956,075

CATALYTIC CRACKING

Philip J. Angevine, Woodbury; Robert G. Bundens, Mullica Hill; Joseph A. Herbst, Turnersville, all of N.J.; Albin Huss, Jr., Chadds Ford, Pa., and Sadi Mizrahi, Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,181
Int. Cl.[5] C10G 11/05
U.S. Cl. 208—120 36 Claims

1. In a catalytic cracking process, undertaken in the presence of a cracking catalyst free of manganese, in a catalytic cracking zone, to upgrade a heavy hydrocarbon feedstock to produce gasoline, during which upgrade, coke formation on the catalyst occurs, wherein the catalyst containing said coke during cracking is conveyed to a regenerator for regeneration and, after regeneration, is reduced in coke content and is conveyed to said zone, the improvement comprising

passing through said zone a heavy hydrocarbon feed,

subjecting the feed to catalytic cracking conditions by passing to said zone a catalyst composition consisting essentially of manganese ultrastable Y and a matrix component, wherein the manganese content ranges from 0.1 to 10 weight percent of the catalyst composition with a Na content which is less than 0.5 weight percent, wherein catalytic cracking conditions include a temperature of about 850° F. to about 1500° F., a catalyst to feed ratio of 1:1 to about 50:1; and

recovering upgraded effluent with gasoline yields greater than that of the cracking catalyst free of manganese.

4,956,076

METHOD OF SCAVENGING HYDROGEN HALIDES FROM LIQUID HYDROCARBONACEOUS MEDIUMS

Spencer S. Awbrey, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Sep. 28, 1989, Ser. No. 414,049
Int. Cl.[5] C10G 7/10
U.S. Cl. 208—291 16 Claims

1. A method for scavenging hydrogen halide species from a liquid hydrocarbonaceous medium comprising an organic phase component and an aqueous phase component, said medium containing such hydrogen halide species, said method comprising adding an effective amount for the purpose of an active alcohol to said medium, said active alcohol reacting with said hydrogen halide species to yield an organic halide that partitions to said organic phase said active alcohol comprising a member selected from the group consisting of allyl alcohol, benzyl alcohol, and tertiary alcohols of the formula

wherein R_1, R_2, and R_3 are the same or different and are chosen from C_1–C_6 alkyl, C_1–C_6 alkenyl, C_1–C_6 alkynyl, and phenyl.

4,956,077

FROTH FLOTATION OF MINERAL FINES

Christopher H. Barwise, Buddle Hill, assignor to Fospur Limited, Somercotes, England

Filed Oct. 21, 1988, Ser. No. 260,615
Claims priority, application United Kingdom, Nov. 17, 1987, 8726857
Int. Cl.[5] B03D 1/02
U.S. Cl. 209—166 16 Claims

1. In a froth flotation process for the beneficiation of mixed mineral particles containing a noncarbonaceous first mineral and a second mineral in which particles of said first mineral which it is desired to recover and particles of said second which it is not desired to recover in an aqueous slurry are treated with a collector for said first mineral prior to the addition of a frother and flotation of the mixed mineral particles in a froth flotation cell wherein the first mineral is selectively concentrated in the froth the improvement comprising adding to the slurry a collector which renders hydrophobic the surfaces of the first mineral particles which it is desired to recover, and then, after said collector addition and prior to the flotation, adding a predominantly hydrophobic non-water soluble polymeric flocculating agent which will selectively adsorb onto the hydrophobic surfaces of said first mineral particles so-formed and flocculate the particles of the first mineral together.

4,956,078

FEED PRESTRATIFICATION ATTACHMENT FOR HIGH EFFICIENCY VIBRATORY SCREENING

Anthony J. Magerowski, Milwaukee; Vijia K. Karra, Greendale; Scott E. Szalanski, Oak Creek, and John A. Gieschen, West Allis, all of Wis., assignors to Nordberg Inc., Milwaukee, Wis.

Filed Jan. 30, 1989, Ser. No. 304,188
Int. Cl.[5] B07B 1/46
U.S. Cl. 209—254 14 Claims

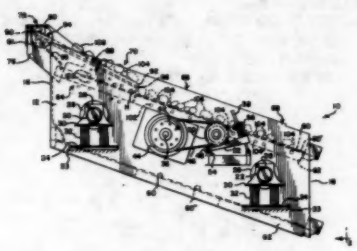
1. A feed prestratification attachment for mounting to a vibrating screen unit having a self-induced vibrating action and vibrating at a specified operating frequency, a feed end and at least one generally planar screening surface rigidly secured to the unit, said attachment comprising:

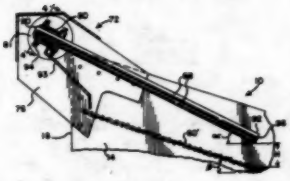
a pair of side adapter plates disposed in spaced parallel relationship to each other, each said plate having plate mounting means for mounting said attachment to the screen unit;

a single elongate member located between said adapter

plates on a generally horizontal plane substantially perpendicular to said plates, said member having rod mounting means; and

a plurality of elongate vibratable rods, each of which being provided with a mounting end and a discharge end, said mounting ends being configured to engage said mounting means so that said rods project in spaced parallel relationship from said elongate member, each of said rods having





a specified length and diameter, said rod length and diameter being specified so that upon the vibration of said rods, feed material deposited on said rods will be preliminarily stratified and distributed between said rods and from said discharge end evenly across the screening surface, said attachment having no means of inducing said vibration of said rods, said vibration being induced through the vibratory action of the screen unit.

4,956,079

APPARATUS FOR TRANSPORTING OBJECTS

Alan Bailey, Cheadle, and David K. Yew, Great Sutton, both of England, assignors to British Nuclear Fuels plc, Warrington, England

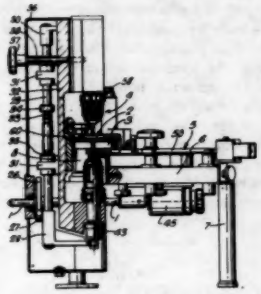
Filed Feb. 13, 1989, Ser. No. 309,293

Claims priority, application United Kingdom, Feb. 29, 1988, 8804497

Int. Cl.[5] B07C *5/02, 5/08*

U.S. Cl. 209—552 **8 Claims**

1. Apparatus for transporting objects through a measuring head comprising a transfer means for receiving objects individually from a supply and conveying the objects to one side of the measuring head, gripper means at the head for receiving the object from the transfer means and carrying the object through a passage through the head, and indexing means at the opposite side of the head to remove the object from the gripper means and to convey the object to an outlet selected in response to signals generated by the object in passing through the head, and a common drive means for synchronised movement of the transfer means, gripper means and indexing means,



said transfer means comprising an arm pivotally mounted on a drive shaft.

4,956,080

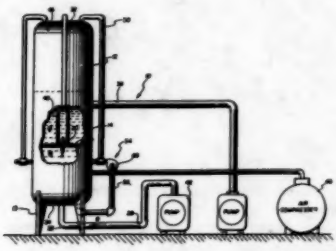
HIGH PRESSURE OXYGEN-SATURATED WATER TREATMENT APPARATUS

John Josefik, Berwyn, Ill., assignor to Microlift Systems, Incorporated, Sturgeon Bay, Wis.

Filed Aug. 3, 1987, Ser. No. 80,993

Int. Cl.[5] C02F *1/74*

U.S. Cl. 210—109 **44 Claims**



1. An improved high pressure oxygen-saturated water treatment apparatus for providing super-saturated oxygen treatment to water, said apparatus comprising:

a pressurized treatment tank having a substantial longitudinal dimension and having a selected liquid level therein;

chamber separation means disposed within said pressurized treatment tank and beneath the selected liquid level thereof for defining two connected liquid containing chambers therewithin, said chamber separation means including aperture means thereon for permitting the flow of water from a first chamber to a second chamber, wherein said first chamber of said pressurized treatment tank is disposed below said second chamber thereof;

treatment water input means disposed on said pressurized treatment tank for input of a treatment water stream into said first chamber thereof;

recirculation water means disposed on said pressurized treatment tank for receiving a stream of recirculation water therefrom;

oxygen input means disposed on said pressurized treatment tank for providing oxygen-containing gas into said pressurized treatment tank and for maintaining said oxygen containing-gas under substantial pressure within said pressurized treatment tank;

oxygen output means disposed on said pressurized treatment

tank for receiving pressurized oxygen-containing gas therefrom to form a pressurized oxygen-containing stream;

venturi means disposed on said pressurized treatment tank for receiving and combining said pressurized oxygen-containing stream with said recirculation water stream under pressure to form a combined injection stream of pressurized water which is super-saturated with oxygen for injection into the treatment tank;

means for injecting the combined injection stream into said first chamber of said tank for substantial intersection with the treatment water stream from said treatment water input means; and

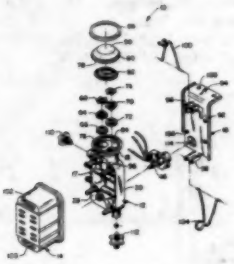
treated water output means disposed on said pressurized treatment tank for output of treated water from said second chamber thereof.

4,956,081

FUEL FILTER WITH DIAPHRAGM PUMP

David H. Hodgkins, Granby, and M. Craig Maxwell, Colchester, both of Conn., assignors to Stanadyne Automotive Corp., Windsor, Conn.

Filed Sep. 30, 1988, Ser. No. 252,060
Int. Cl.[5] B01D *29/00*
U.S. Cl. 210—136 **7 Claims**



1. A fuel conditioning unit for an internal combustion engine comprising:

a frame having a perimeter including top, bottom, front and rear walls, and having first and second sides;

a priming pump projecting upwardly from the top wall of the frame;

a housing connectable to one side of the frame and containing an internal chamber for receiving at least one fuel filter element;

flow passage means for directing a flow of fuel into an inlet port in the frame, through the priming pump, the chamber, and out of an outlet port in the frame;

wherein the prime pump comprises,

a basin having a suction opening for receiving fuel from the inlet port and a discharge opening for delivering fuel to the chamber,

suction valve means associated with the suction opening, for admitting fluid into the basin only when the fluid pressure in the basin is less than the fluid pressure in the inlet port,

discharge valve means associated with the discharge opening, for discharging fluid from the basin into the chamber only when the fluid pressure in the basin is greater than the fluid pressure in the chamber,

a diaphragm sealingly mounted to the basin and forming a dome thereover, and

means associated with the basin, for biasing the diaphragm convexly outwardly, such that the diaphragm provides a crown surface for manually actuating the priming pump;

a mounting bracket of material dissimilar to that of the frame connected to the other side of the frame; and

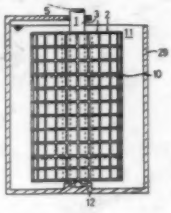
clip means connected between the bracket and the housing, for holding the bracket, frame and housing together as an assembled unit.

4,956,082

CENTRIFUGAL BIO-CONTACTOR APPARATUS

Sung Hui Choi, 615-20, Banghak-2-Dong, Dobong-ku, Seoul 132-022, Rep. of Korea

PCT No. PCT/KR88/00002, § 371 Date Sep. 16, 1988, § 102(e) Date Sep. 16, 1988, PCT Pub. No. WO88/05764, PCT Pub. Date Aug. 11, 1988
PCT Filed Jan. 30, 1988, Ser. No. 249,925
Int. Cl.[5] C02F *3/08*
U.S. Cl. 210—150 **22 Claims**



22. Apparatus for treating waste water comprising a reactor vessel containing said waste water, and a means for biologically contacting said waste water, said biological contacting means comprising a rotor means on which microorganisms are attached, said rotor means being disposed in said reactor vessel and fully submerged in said waste water in said reactor vessel, said rotor means having opposite spaced longitudinal ends, a rotor shaft rotatably supporting said rotor means for rotation in said reactor vessel about a rotor axis, said rotor means having an outer cylindrical boundary and an inner cylindrical boundary, said outer cylindrical boundary being spaced radially outwardly of said inner cylindrical boundary, said rotor means having an internal space between said outer and inner cylindrical boundaries, a plurality of spaced longitudinal ribs extending from said outer cylindrical boundary into said space between said outer and inner cylindrical boundaries, said longitudinal ribs extending longitudinally of said rotor means from one of said longitudinal ends to the other of said longitudinal ends, said longitudinal ribs each intersecting said outer cylindrical boundary at a point of intersection, each of said longitudinal ribs extending from its respective point of intersection at an acute angle relative to a tangent line which is tangential to said outer cylindrical boundary at said point of intersection, and a plurality of spaced transverse ribs disposed generally perpendicular to said longitudinal ribs and joined to two of said longitudinal ribs which are successively spaced such as to form waste water passages between successive spaced transverse ribs and successive spaced longitudinal ribs, said longitudinal ribs being operable to impart a centrifugal force to the waste water in said waste water passages as said submerged rotor means rotates in said reactor vessel.

4,956,083

WATER PURIFICATION DEVICE

Domingo Tovar, 8530 Cedros Ave., #7, Panorama City, Calif. 91402

Filed Jun. 1, 1989, Ser. No. 359,607
Int. Cl.[5] C02F *1/48*
U.S. Cl. 210—222 **3 Claims**

3. A water purification device, said device comprising, in combination:

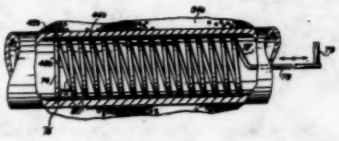
(a) a hollow casing split into a pair of mating sections releas-

ably connected together, for easy access to the inside of said casing;

(b) a water pipe disposed in said casing and extending out opposite ends thereof;

(c) an electromagnetic coil disposed around said pipe in said casing;

(d) a non-rotating, flexible and accordion-shaped water impeller secured longitudinally in said pipe, said impeller including a plurality of spaced accordian pleats;



(e) means for moving said impeller between a collapsed position and an extended position to change the number and pitch of said accordian pleats within said coil so as to mix and control the residence time of of water passing through said pipe; and

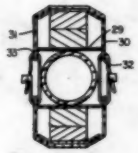
(f) electrical means within said casing and extending out thereof for passing a current through said coil to energize said coil.

4,956,084

SIMPLIFIED APPARATUS FOR INTENSIFIED MAGNETIC TREATMENT OF LIQUIDS

Jeffrey G. Stevens, 413 209th Ave., N. E., Redmond, Wash. 98053

Filed Aug. 21, 1989, Ser. No. 396,034
Int. Cl.[5] C02F 1/48
U.S. Cl. 210—222 **5 Claims**



3. Apparatus for magnetic treatment of liquid in a conduit made of non-magnetic material and having a first longitudinal axis, said apparatus comprising:

at least two permanent magnets each having a rectangular crossectional shape, a first length, a first width, a second longitudinal axis and first and second faces opposite each other, said magnets being polarized such that said first face is the north pole of each of said magnets and said second face is the south pole, said first width being transverse to said first and second faces,

two backing plates, each being planar, rectangular in planform and having a second length and a second width, said second length being equal to said first length, and said second width being greater than said first width,

two cover boxes made of non-magnetic material, each of said two boxes completely enclosing at least one of said magnets and one of said backing plates, each of said boxes further having a portion in contact with said second face of said at least one of said magnets and further having first and second outer sides and at least one tab extending from each of said first and second outer sides in a direction essentially perpendicular to said second face of said at least one magnet in said cover box, said backing plate being positioned symmetrically on said first face of said magnet, each of said at least one tabs on said outer sides having a slot and

two tie straps for securing the cover boxes together, wherein one of said tie straps extends through the slots in the tabs on said first outer sides and the other of said tie straps extends through the slots in the tabs on said second outer sides,

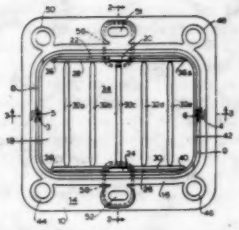
whereby said apparatus is assembled on said conduit by positioning said cover boxes such that said magnets are opposite each other with at least one of said second faces separated from said conduit by said portion of said cover box in contact with said second face of said at least one of said magnets and said first and second longitudinal axes parallel and said outer sides in alignment and passing said tie straps through said slots in said tabs extending from said aligned outer sides and connecting and tightening said staps to hold said apparatus firmly in place on said conduit.

4,956,085

FILTER PLATE, FILTER PLATE ELEMENT AND FILTER COMPRISING SAME

Henry B. Kopf, 108 Coathridge Cir., Cary, N.C. 27511

Division of Ser. No. 104,177, Oct. 2, 1987, Pat. No. 4,867,876.
This application Jul. 11, 1989, Ser. No. 378,032
Int. Cl.[5] B01D 25/12, 13/00
U.S. Cl. 210—231 **6 Claims**



1. A filter plate having a generally planar and rectangular shape with a substantially flat bottom surface, and a top surface with an upwardly extending wall circumscribingly bounding a flow channel of generally rectangular shape with said top surface bounded by said upwardly extending wall comprising a top surface bounded by said upwardly extending wall comprising a floor of said flow channel, with a liquid inlet port at a medial part of a first side of said flow channel and a liquid outlet port at a medial part of a second side of said flow channel opposite said first side thereof, said liquid inlet port being joined in liquid flow communication with a liquid feed trough extending transversely across said first side of said flow channel, and said liquid outlet port being joined in liquid flow communication with a liquid collection trough extending transversely across said second side of said flow channel, with a plurality of spaced-apart partitions extending upwardly from the floor of said flow channel between said liquid feed trough and liquid collection trough, said partitions being of lesser height than said wall circumscribing said flow channel and substantially parallel to one another to define a series of subchannels extending longitudinally between said liquid feed trough and said liquid collection trough, said liquid feed trough being of progressively decreasing depth from its medial portion, in communication with said liquid inlet port, to its marginal extremities, and said liquid collection trough being of progressively decreasing depth from its medial portion, in communication with said liquid outlet port, to its marginal extremities.

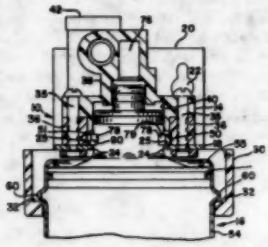
4,956,086
FILTER CARTRIDGE WITH A LUGGED CONCENTRIC CLOSURE PORTION

Jack W. Thomsen, LaGrange Park; Perialwar Regunathan, Wheaton, and John W. Tadlock, West Chicago, all of Ill., assignors to Everpure, Inc., Westmont, Ill.

Continuation-in-part of Ser. No. 257,338, Oct. 13, 1988, Pat. No. 4,857,189. This application Jun. 8, 1989, Ser. No. 363,630

Int. Cl.[5] B01D *27/08*

U.S. Cl. 210—232 **5 Claims**



1. A filter cartridge for insertion into a filter head having fluid inlet and outlet ports and adapted to be permanently mounted in a fluid conduit comprising:

(a) a pressure vessel closed at one end and adapted to have a filter element disposed therein;

(b) a closure member in sealed relationship with the open end of said pressure vessel,

said closure member being formed with inlet and outlet ports therein for communicating with inlet and outlet ports in a filter head with which the filter cartridge is adapted to be associated,

said closure member also being formed with a pair of unequal diameter concentrically disposed axially projecting tubular portions which define inlet and outlet ports to and from the pressure vessel, one of said tubular portions extending axially beyond the other;

(c) a first pair of laterally extending oppositely disposed lug members formed on the outer surface of said pressure vessel;

(d) a second pair of laterally extending oppositely disposed lug members formed on the outer surface of the tubular portion having the larger diameter; and

(e) means formed on said second pair of lug members for coacting with a portion of a filter head with which the filter cartridge is adapted to be associated, said means formed on said second pair of lug members being adapted to function in coaction with a filter head to restrict potential axial movement during operation and under pressure of said closure member relative to said pressure vessel.

4,956,087
MODULE FOR RIGID CYLINDRICAL MEMBRANE ELEMENTS FOR SEPARATION, FILTRATION, OR CATALYTIC TRANSFORMATION

Daniel Garcera, Tarbes, and Jacques Gillot, Laloubere, both of France, assignors to Societe Anonyme dite: Societe des Ceramiques Techniques, Bazet, France

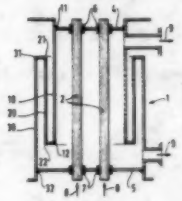
Filed Jul. 7, 1989, Ser. No. 376,454

Claims priority, application France, Jul. 29, 1988, 88 10280

Int. Cl.[5] B01D *63/04*

U.S. Cl. 210—321.8 **17 Claims**

1. A module comprising rigid cylindrical membrane elements for separation, filtration, or catalytic transformation, a vessel receiving said elements having an exterior tubular wall about said elements and which is generally cylindrical and parallel to said elements, first and second end plates closing opposite ends of said exterior tubular wall of said vessel, opposite ends of said elements being fixed by means of seals to respective end plates, the improvement wherein said end plates are interconnected by at least one spacer constituted by at least three juxtaposed oblong parts, said first part being fixed to said first end plate, the third part being fixed to said second end plate, and the second part being fixed to the free ends of said



first and third parts, and wherein the material of said three parts have individual thermal expansion coefficients such as to ensure that their overall axial thermal expansion is equal to the axial thermal expansion of said active elements.

4,956,088
METHOD AND APPARATUS FOR PRESSURIZED DEWATERING

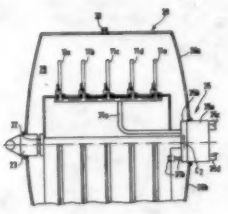
Rolf Hindström, Turku, Finland, assignor to Outokumpu Oy, Finland

Filed May 8, 1989, Ser. No. 348,961

Claims priority, application Finland, May 6, 1988, 882128

Int. Cl.[5] B01D *29/80*

U.S. Cl. 210—327 **4 Claims**



3. Apparatus for filtering, comprising

a plurality of filter plates each comprising a finely porous suction face having a pore size of about 0.05 to 2 microns arranged to be brought into contact with material to be filtered, saturated with liquid and hydraulically connected with liquid under negative pressure relative to the material to be filtered,

a pressure-tight cover surrounding each said filter plate and defining a space into which positive pressure can be introduced for accelerating removal of liquid out of the material to be filtered,

a shaft upon which said filter plates are circumferentially mounted,

a lower basin within said pressure tight cover into which said plates are arranged to pass along with rotation of said shaft, with the material to be filtered adhering to said faces of said plates by effect of said negative pressure and also rising along with rotation of said shaft and plates out of said basin, and into said pressure space within said cover above said basin by said negative pressure containing to be applied,

at least one doctor mounted to remove filtered material from said faces of said plates as each said plate further moves into contact with said at least one doctor

a conveyor arranged to receive the material removed by said at least one doctor which falls thereon by effect of gravity,

and to transfer the material out from an interior of said apparatus within said cover,

said filter plate comprising several groups of filter plates, each group comprising several filter plates and being rotatably mounted upon said shaft, and

several doctors, each said doctor being positioned to remove material from plates in a respective group thereof,

means for generating said negative pressure which comprise

a duct communicating with an interior of each said plate, and

a valve mounted in said duct, said valve comprising a rotor part and a stator part,

with said rotor part rotatably mounted to revolve along with said shaft and fitted inside said cover, and said stator part against which said rotor part is arranged to glide, being fitted in a stationary pressure-sealing position against said cover.

4,956,089

FORMING AN END-CAP ON A FILTER CARTRIDGE

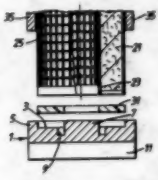
Stephen Hurst, 52 The Street, West Horsley, Leatherhead, Surrey, United Kingdom KT24 6AX

Continuation of Ser. No. 823,502, Jan. 8, 1986, abandoned. This application Apr. 21, 1987, Ser. No. 45,157

Claims priority, application United Kingdom, May 10, 1984, 8411912

Int. Cl.[5] B01D *27/08*

U.S. Cl. 210—484 **33 Claims**



1. A method of forming an end-cap on a filter cartridge comprising a filter medium and at least one supporting member of thermoplastic plastics material extending the length of said cartridge adjacent said medium, which method comprises bringing an end of said cartridge into engagement with a heated die at a temperature high enough to melt said material of said supporting member or members, and forming with said molten material an end-cap having an end portion of said filter medium sealingly embedded in or fused to it, wherein the length of said filter cartridge measured to an axially outer face of said end-cap is less than the overall length of said cartridge before formation of said end-cap.

4,956,090

HYDROCYCLONE DIVIDED INTO SECTIONS

William Robinson, Täby, Sweden, assignor to Richard Berg Aktiebolag, Taby, Sweden

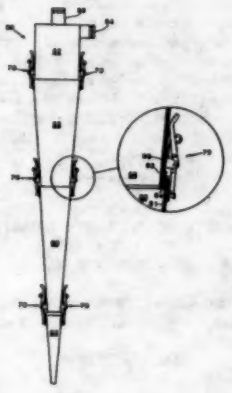
Filed Apr. 14, 1989, Ser. No. 338,970

Claims priority, application Sweden, Apr. 29, 1988, 8801635

Int. Cl.[5] B01D *17/038*; B04C *5/08*

U.S. Cl. 210—512.1 **5 Claims**

1. Hydrocyclone, suitable for the cleaning of fibre suspensions in pulp and paper factories, comprising an elongated conical housing comprising a number of sections of truncated conical form, which are connected to one another, the interior of which housing defines a conically tapering cyclone chamber into which is to flow the suspension to be cleaned along the inside of the housing from the widest part to the narrowest part of the chamber whilst rapidly circulating, wherein at least two of the truncated conical sections of the housing are situated one next to the other and are so dimensioned that the truncated conical lower end portion of one of the two sections projects for a small distance in the direction of flow into the adjacent truncated conical upper end portion of the other section in the direction of flow, so as to form a joint in which the outside of the inward-projecting truncated conical lower end portion of the one section snugly radially opposes the inside of the truncated conical upper end portion of the other section in nested relation therewith, means actuable to a locked condition for (1)



preventing separation of the two sections and (2) exerting a continuing force lengthwise of the two sections pulling the two sections into rigidly jammed nesting engagement, such means comprising at least two quick-action locks distributed circumferentially equally around the joint between the two sections, the two sections being releasably fixed together by said locks, said locks being actuable to pull the two sections forcibly together.

4,956,091

APPARATUS FOR SEPARATING SOLID PARTICLES FROM A FLUID

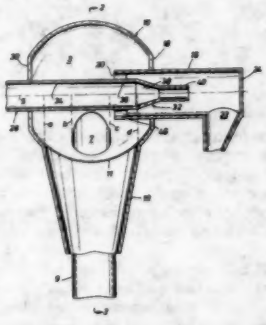
Hendrikus E. A. Van Den Akker, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 20, 1989, Ser. No. 409,896

Claims priority, application United Kingdom, Sep. 22, 1988, 8822350

Int. Cl.[5] B01D *21/26*

U.S. Cl. 210—512.2 **10 Claims**



1. Apparatus for separating solid particles from a fluid, said apparatus comprising an upright enclosed swirl chamber hav-

ing a central longitudinal axis and a curved wall, a tangential inlet for a mixture of fluid and solid particles and a solids outlet, both said inlet and outlet extending perpendicularly to said central longitudinal axis of the swirl chamber and being in direct fluid communication with the swirl chamber, and a cyclone separator which includes a coaxial swirl tube extending through the wall of the swirl chamber and having an open end disposed in said swirl chamber and having a solids outlet opening disposed outside said swirl chamber, a coaxially disposed fluid outlet tube extending through the wall at the side of the swirl chamber opposite said cyclone separator, said outlet tube having an inlet part disposed in said swirl tube, and having swirl imparting means disposed in an annular space between said inner surface of the wall of said swirl tube and the outer surface of the wall of said fluid outlet tube, said swirl imparting means being so disposed that during operation of said apparatus, the direction of rotation in the swirl tube is the same as the direction in the swirl chamber.

4,956,092

METHOD FOR CONCENTRATING/DEHYDRATING OF SEWAGE SLUDGE

Holger Blum, Parkallee 75, D-2000 Hamburg 13, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 392,366

Claims priority, application European Pat. Off., Aug. 23, 1988, EP88 113 720.2

Int. Cl.[5] C02F *11/14*

U.S. Cl. 210—609 **8 Claims**

1. A method for concentrating/dehydrating sewage sludge including activated sludge in the presence of organic polyelectrolytes and/or inorganic flocculators, which comprises producing the activated sludge portion in an aerated biologic clarification step in the presence of at least one compound selected from the group consisting of folic acid, dihydrofolic acid and at least one salt thereof.

4,956,093

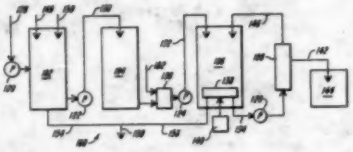
WASTEWATER TREATMENT PROCESS

Massoud Pirbazari, 11634 Gorham Ave., #101, Los Angeles, Calif. 90089, and Jacob Shorr, 56 Liberty Ave., Lexington, Mass. 02173

Continuation-in-part of Ser. No. 899,416, Aug. 22, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 178,189

Int. Cl.[5] C02F *3/08*

U.S. Cl. 210—616 **2 Claims**



1. A process for treating wastewater including waste organic materials, said process comprising the steps of:

providing biologically active powdered activated carbon particles carrying on the outer surfaces thereof an active biological layer including bacteria that is biologically reactive with and biodegrades at least some of said organic compounds;

mixing said biologically active activated carbon with said wastewater in a tank having an outlet and a recirculation loop having an isotropic membrane filter arranged to retain said particulate material in the portion of said wastewater recirculated and turned to said tank, and to pass a filtered parmeate, said loop connected to said outlet and arranged to withdraw liquid from said tank, pass said liquid through said loop, and introduce at least a fraction of said withdrawn liquid back into said tank; and,

circulating said wastewater and said biologically active activated carbon through said loop under turbulent flow conditions thereby to maintain said biological layers on said particles at mean thicknesses less than about 20 microns.

4,956,094

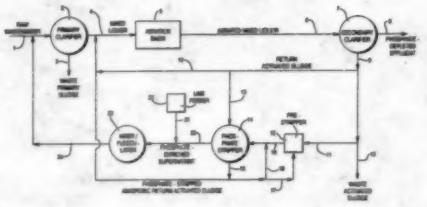
ENHANCED PHOSPHATE REMOVAL FROM BOD-CONTAINING WASTEWATER

Gilbert V. Levin, Annapolis, and Ronald R. Wright, Parkville, both of Md., assignors to Biospherics Incorporated, Beltsville, Md.

Continuation-in-part of Ser. No. 291,419, Dec. 22, 1988, abandoned, which is a continuation of Ser. No. 169,145, Mar. 10, 1988, abandoned, which is a continuation of Ser. No. 833,110, Feb. 26, 1986, abandoned. This application Jul. 21, 1989, Ser. No. 374,137

Int. Cl.[5] C02F *3/30*

U.S. Cl. 210—625 **20 Claims**



1. An activated sludge wastewater treatment process which comprises aerating a mixed liquor of phosphate-containing influent wastewater and activated sludge in an aeration or high-purity oxygen zone to reduce the BOD/COD content of said wastewater and to cause the microorganisms present to take up phosphate; separating a phosphate-enriched sludge, in which the phosphate is present in the sludge solids, from the mixed liquor to provide a substantially phosphate-free effluent; passing at least a portion of said phosphate-enriched sludge to a phosphate pre-stripping zone where BOD/COD-containing water containing at least 50 mg/L of BOD is added to poise the sludge organisms to begin enhanced release of phosphate; and thence passing said sludge to a phosphate stripping zone and settling, or partially settling, said sludge to form supernatant liquor; maintaining said settled, or partially settled, sludge under anaerobic conditions for a time sufficient to complete the release of the desired amount of phosphate from the sludge solids to the liquid phase; contacting at least a portion of the anaerobic sludge, which contains released phosphate in the liquid phase thereof in said phosphate stripping zone, with a lower soluble phosphate content aqueous medium to transfer the soluble phosphate in the anaerobic sludge liquid phase to said lower soluble phosphate content aqueous medium for conveying phosphate into the supernatant liquor, thereby enriching said stripping zone upper section; and recycling at least a portion of said anaerobic sludge from said phosphate stripping zone to said aeration or high-purity oxygen zone as said activated sludge.

4,956,095

WATER OR GAS PURIFICATION BY BULK ABSORPTION

Lloyd M. Robeson, Macungie, and Michael Langsam, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Dec. 29, 1989, Ser. No. 459,009
Int. Cl.[5] B01D *53/14;* C02F *1/28*
U.S. Cl. 210—670 6 Claims

1. A process for removing trace organic impurities from water or gas which comprises passing water or gas containing said impurities into a contact zone containing a fixed or moving bed of a bulk absorbent in particulate or granular form comprising solid insoluble polymer of a monomer having the general formula:

$$H_3C—C{\equiv}C—SiR_3$$

wherein each R is methyl or ethyl, contacting said water or gas with said absorbent, and removing purified water or gas from said zone.

4,956,096

PROCESS FOR REMOVING FROM ELECTROCOATING BATHS IMPURITIES WHICH CAUSE SURFACE DEFECTS

Klaus Arlt, Senden; Theodora Dirking, Munster; Karl H. Josten, Munster, and Hans J. Streitberger, Munster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben AKT, Munster, Fed. Rep. of Germany

Continuation of Ser. No. 74,483, Jun. 29, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 384,915
Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540575
Int. Cl.[5] B01D *15/00*
U.S. Cl. 210—692 4 Claims

1. A process for purifying an electrocoating bath contaminated with hydrophobic substances having a surface tension less than 35 mN/m, comprising

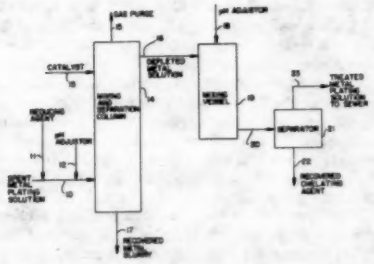
passing, without pressure the contaminated electrocoating bath through an adsorbent volume of solid, fiberous or particulate homo or copolymer of ethylene, propylene, but-1-ene or but-2-ene to remove the hydrophobic substances by adsorption onto the solid, fibrous or particulate homo or copolymer.

4,956,097

WASTE TREATMENT OF METAL CONTAINING SOLUTIONS

Constantine I. Courduvelis, Orange, Conn., assignor to Enthone, Incorporated, West Haven, Conn.

Continuation of Ser. No. 255,471, Oct. 11, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 425,493
Int. Cl.[5] C02F *1/62*
U.S. Cl. 210—718 8 Claims



1. In a process for waste treating a metal and reducing agent containing solution by loading the solution with a catalytic material which decomposes the solution and precipitates the metal and generates a gaseous reaction product, separating the precipitated metal and discharging the solution into a waste system, the improvement comprising:

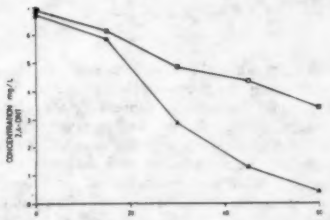
performing the decomposition reaction in the substantial absence of air in a closed vessel from which the gaseous reaction product formed during the waste treatment process is purged.

4,956,098

OXIDATION AND PHOTOXIDATION PROCESS

R. D. Samuel Stevens, Thornhill, and Stephen R. Carter, Willowdale, both of Canada, assignors to Solarchem Enterprises Inc., Toronto, Canada

Filed Aug. 19, 1988, Ser. No. 234,044
Int. Cl.[5] C02F *1/32, 1/58, 1/78*
U.S. Cl. 210—748 14 Claims



1. A process for treating an aqueous stream containing an oxidizable contaminant that has at least one electron donating aromatic group comprising:

adding a sufficient amount of a compound selected from the group consisting of carbonate and bicarbonate to the stream to provide an aqueous stream having a stochiometric excess amount of said compound to react with the contaminant and to increase the pH of the stream to a basic level; and,

subjecting the basic aqueous stream to an oxidation process to oxidize the oxidizable contaminant.

4,956,099

METHODS FOR TREATING HYDROCARBON RECOVERY OPERATIONS AND INDUSTRIAL WATERS

Neil E. S. Thompson, Creve Coeur, and Robert G. Asperger, Des Peres, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 208,627, Jun. 20, 1988, Pat. No. 4,864,075, which is a continuation-in-part of Ser. No. 7,701, Jan. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 645,740, Aug. 30, 1984, abandoned. This application Jun. 30, 1989, Ser. No. 374,899
Int. Cl.[5] C02F *1/50*
U.S. Cl. 210—764 5 Claims

1. A method of inhibiting bacteria growth in water produced in the recovery of oil by a water flooding operation comprising adding thereto an effective bacteria growth inhibiting amount of a compound having the formula

$$R[(OR_1)_x—NH—C(=S)SR_2]_n$$

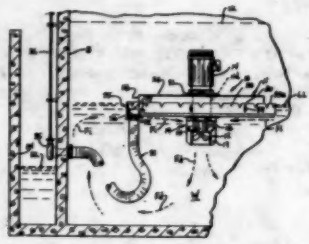
wherein R is a divalent, trivalent or tetravalent saturated hydrocarbon radical; R_1 is a C_2–C_4 alkylene; X is an integer of 1 to about 30 n is an integer corresponding to the valence of R; R_2 is an alkali metal, alkaline earth metal or $N(R_3)_4$ where R_3 is a lower alkyl.

4,956,100

METHOD AND APPARATUS FOR MIXING AND SURFACE SKIMMING WATER TREATMENT BASINS

Kenneth A. Mikkleson, Madison, Wis., assignor to Aqua-Aerobic Systems, Inc., Rockford, Ill.

Filed Jun. 13, 1989, Ser. No. 365,354
Int. Cl.[5] C02F 1/40
U.S. Cl. 210—717.6 8 Claims



1. A method for mixing liquid and suspendible solids or gases in a treatment basin and removing floating matter from a surface of the liquid comprising, supporting a propeller type pump apparatus having inlet and discharge sides on a floating support in a treatment basin with the inlet side of the pump apparatus in direct communication with the liquid in the basin at a level spaced below the surface thereof, providing a shield on the floating support above the inlet side of the pump apparatus and extending below the surface of the liquid in the basin to inhibit direct passage of liquid from the area of the basin above the shield to the inlet side of the pump apparatus and with the discharge side of the pump apparatus arranged to direct the liquid pumped thereby downwardly in the basin, supporting a collection trough having an upper weir edge defining a trough inlet on the floating support with the upper weir edge adjacent the surface of the liquid in the basin to receive matter floating on the surface of the basin, driving the pump apparatus to draw liquid into the inlet side of the pump apparatus from below the surface of the liquid in the basin and direct liquid from the discharge side of the pump apparatus downwardly in the basin at a velocity to mix the liquid and suspendible solids or gases in the basin, and discharging material from the collection trough.

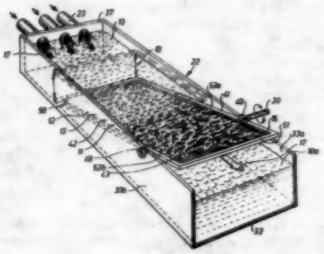
4,956,101

LIQUID FILTRATION DEVICE AND METHOD USING WAVE MOTION

Glenn Holmberg, Tyringe, Sweden, assignor to Handelsbolaget Sea-Parator, Halmstad, Sweden

Continuation of Ser. No. 274,379, Nov. 21, 1988, abandoned, which is a continuation of Ser. No. 33,118, Feb. 4, 1987, abandoned. This application Nov. 2, 1989, Ser. No. 430,826
Claims priority, application Sweden, May 17, 1985, 8502442
Int. Cl.[5] B01D 33/00
U.S. Cl. 210—780 26 Claims

23. A method of separating bodies from a liquid comprising supplying liquid containing bodies to be separated therefrom into a channel member, reciprocally moving a filter member relative to the channel member such that liquid travels through the filter member in opposite directions, separating bodies from the liquid on the upper surface of the filter member during reciprocal movement of the filter member while the liquid travels in a main direction of flow through the filter member, separating the accumulated bodies from the upper surface of the filter member while the filter member moves in said main direction of flow of the liquid, and displacing said bodies, when separated from said filter member, towards a discharge end of the filter member, said filter member moving downwardly when the bodies are separated from the upper surface of the filter member and the liquid flowing upwardly through the filter member to assist in the separation of the bodies from the upper surface of the filter member, said liquid which flows upwardly through the filter member being at a lower level than



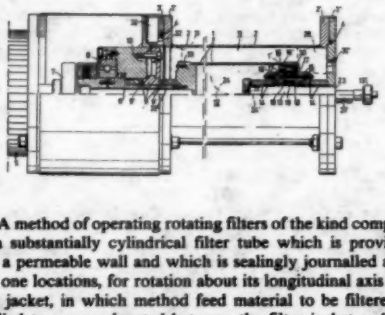
the remainder of the liquid in the channel member whereby a wave is formed which acts to displace the separated bodies towards said discharge end.

4,956,102

METHOD FOR OPERATING ROTATING CYLINDRICAL FILTERS AND A ROTATABLE CYLINDRICAL FILTER

Karl J. Allsing, Nibblevägen 28, S-146 00 Tullinge, Sweden

PCT No. PCT/SE87/00403, § 371 Date Mar. 2, 1989, § 102(e) Date Mar. 2, 1989, PCT Pub. No. WO88/01899, PCT Pub. Date Mar. 24, 1988
PCT Filed Sep. 8, 1987, Ser. No. 326,541
Claims priority, application Sweden, Sep. 8, 1986, 8603753
Int. Cl.[5] B01D 33/067, 33/48
U.S. Cl. 210—784 36 Claims



1. A method of operating rotating filters of the kind comprising a substantially cylindrical filter tube which is provided with a permeable wall and which is sealingly journalled at at least one locations, for rotation about its longitudinal axis in a filter jacket, in which method feed material to be filtered is supplied to a space located between the filter jacket and the filter tube, and in which filtered material, the filtrate, can be tapped from the interior of the filter tube, characterized by the step of sealing and journalling the filter tube (1) in a manner adapted to substantial temperature changes of the filter tube, seals and bearings being adapted to take up axial displacement movements and forces resulting essentially from changes in the temperature of the filter tube, by means of a journalling and sealing unit attached to the filter tube (1) and arranged adjacent at least one end (1') of the filter tube, said unit comprising two substantially cylindrical parts (15', 16'), one external (15') and one internal (16'), which are co-acting in a sealed and axially displaceable relationship.

18. A filter of the rotating kind comprising a substantially cylindrical filter jacket, a substantially cylindrical filter tube which has a permeable wall and which is sealingly journalled by seals and bearings at least one axial locations, for rotation about its longitudinal axis in said filter jacket, the material to be filtered, the feed, being supplied to a first space located at one

end of and between the filter jacket and the filter tube, and the filtered material, the filtrate, being tapped from the interior of the filter tube, and wherein the seals (9, 14, 20, 21) and bearings of the filter tube (1) are sterilizably arranged and constructed so as to take up axial displacement movements and forces resulting essentially from changes in the temperature of the filter tube (1), seals and bearings comprising means including a journalling and sealing unit attached to said filter tube (1) and arranged adjacent said one end (1') of said filter tube (1), said unit comprising two substantially cylindrical parts (15', 16'), one external (15') and one internal (16'), which are arranged to co-act in a sealed and axially displaceable relationship, and wherein said seals (9, 14, 20, 21) and bearings are constructed to enable said seals and bearings to be sterilized and lubricated and cooled by means of a sterilizing media.

4,956,103

FAIL SAFE RELEASIBLE LOCKS FOR CAPPED DISPOSABLE CENTRIFUGE CONTAINERS

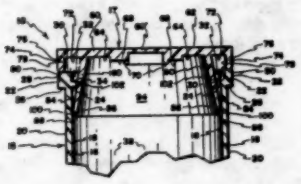
Paul M. Jessop, and David H. Jeffs, both of Salt Lake City, Utah, assignors to Multi-Technology Inc., Midvale, Utah

Division of Ser. No. 271,141, Nov. 14, 1988, which is a division of Ser. No. 191,518, May 9, 1988, Pat. No. 4,830,209. This application Apr. 26, 1989, Ser. No. 343,543

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] **B65D** *45/00*

U.S. Cl. 210—787 **8 Claims**



6. A method of holding a capped liquid specimen container in a leak-free closed state during centrifuging, boiling and like processing in a specimen testing laboratory comprising the steps of:

manually closing the cap upon the opening of the container so that a male portion compressively engages the interior of the container;

manually forcing a releasible lock of synthetic resinous material over and under the closed cap and adjacent portion of the container contrary to the memory of the material of the lock to hold the closed cap and to the adjacent portion of the container prohibiting loss of any portion of the liquid specimen through the container opening and across the cap during boiling and centrifuging;

manually removing the releasible lock following processing of the liquid specimens in the container.

4,956,104

ORGANOPHILIC POLYMERS

Jack C. Cowan, Lafayette, La.; Roy F. House, Houston, Tex., and Victor M. Granquist, Beaufort, S.C., assignors to Venture Chemicals, Inc., Lafayette, La.

Division of Ser. No. 161,478, Feb. 29, 1988, Pat. No. 4,863,980, which is a continuation-in-part of Ser. No. 887,360, Jul. 21, 1986, Pat. No. 4,737,295. This application Jun. 1, 1989, Ser. No. 360,020

Int. Cl.[5] **C09K** *7/06*

U.S. Cl. 252—8.551 **6 Claims**

1. An oil base well working fluid comprising a major proportion of oil and a minor proportion but sufficient to decrease the fluid loss of said fluid of an organophilic polymer comprising an adduct of a water soluble polymer and one or more phosphatides having the empirical formula

$$R_1—CO—O—CH_2—CH(R_2)—CH_2—Q$$

where: R_1 is an aliphatic group containing from 8 to 29 carbon atoms; R_2 is selected from the group consisting of H, OH, R_1COO, and $OP(O)(O^-zM^{a+})OZ$; Q is selected from the group consisting of R_1COO and $OP(O)(O^-zM^{a+})OZ$; Z is selected from the group consisting of xM^{a+}, $C_6H_6(OH)_5$ and $CH_2—CH(Y)—N(R_3)(R_4)(R_5)_y(A^{b-})_x$; Y is selected from the group consisting of H and $COO(xM^{a+})$; R_3, R_4, and R_5 are independently selected from the group consisting of H, aliphatic groups containing from 1 to 30 carbon atoms, and R_6CO; R_6 is an aliphatic group containing from 1 to 29 carbon atoms; M is a cation selected from the group consisting of H, and alkali metal, an alkaline earth metal, ammonium, and mixtures thereof; A is an anion of valence b; y=0 or 1; w, x, and z=0 or 1/a where a is the valence of M; v=0 or a/b; and where Q is R_1COO only when R_2 is $OP(O)(O^-zM^{a+})OZ$.

2. The oil base well working fluid of claim 1 wherein said water soluble polymer is a cationic or anionic polysaccharide or derivative thereof selected from the group consisting of alginic acid, agar, carrageenan, cellulose, chitin, guar gum, gum arabic, gum ghatti, gum karaya, gum konjak, gum tamarind, gum tara, gum tragacanth, locust bean gum, pectins, starch, xanthan gum, and mixtures thereof.

4,956,105

LUBRICANT COMPOSITION CONTAINING PHENOLIC/PHOSPHORODITHIOATE BORATES AS MULTIFUNCTIONAL ADDITIVES

Liehpao O. Farng, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

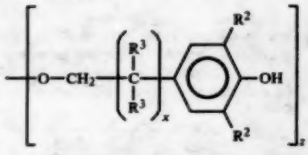
Filed May 31, 1988, Ser. No. 200,345

Int. Cl.[5] **C10M** *105/12, 105/72, 105/74*

U.S. Cl. 252—32.7 E **31 Claims**

1. A lubricant composition comprising a major amount of an oil of lubricating viscosity or grease or other solid lubricant prepared therefrom and a minor effective multifunctional antioxidant and antiwear improving amount of an additive compound of a hindered phenolic phosphorodithioate-derived alcohol borate obtained by co-boronating said phosphorodithioate-derived alcohol with a hindered phenolic alcohol to form a mixture of borate esters at least a portion of which has one or more of the following general structures:

$$[(RO)_2PSS+C(R^1)_2C(R^1)_2—O\rightarrow_{a/y}B—$$



wherein a=1 to 10 and where R is C_3 to about C_{30} hydrocarbyl, R^1 is hydrogen or C_1–C_{30} hydrocarbyl,

R^2 and R^3 are each independently hydrogen, or C_1–C_{10} hydrocarbyl,

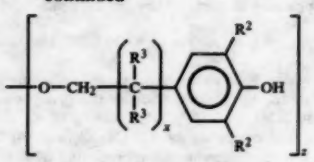
x is 0 to 10,

y and z are integers and y+z=3 or

or

$$[(RO)_2PSS+C(R^1)_2C(R^1)_2—O\rightarrow_{a/y}B(—OH)—$$

-continued



where a=1 to 10 and where x, y, z, R, R^1, R^2, and R^3 are as defined above and y+0 integers the sum of which=2.

25. An additive product suitable for use in lubricant compositions having improved antioxidant and antiwear properties prepared by reacting a hindered phenol, a phosphorodithioic-derived alcohol and a boronating compound.

4,956,106

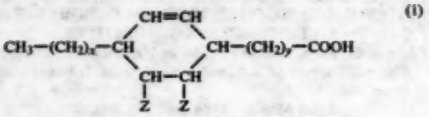
LOW FOAMING RUST INHIBITING COMPOSITION

Fred E. Woodward, W. Palm Beach, and Alice P. Hudson, Lake Park, both of Fla., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 15, 1988, Ser. No. 169,214
Int. Cl.[5] C23F 11/10
U.S. Cl. 252—390 **14 Claims**

1. A water soluble rust inhibiting composition comprising:

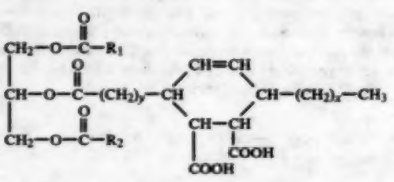
A. a rust inhibiting amount of a water soluble dicarboxylic acid of the formula:



(1)

where Z=COOH or H, and one of each is present, and x and y are from 3 to 9, with $x+y=12$;

B. a foam inhibiting amount of a vegetable oil adduct of the formula:



(2)

wherein x and y are integers from 3 to 9, x and y togther equal 12, and R_1 and R_2 are saturated/unsaturated hydrocarbon terminals of fatty acids;

C. a base to adjust the pH of the composition to about 6.5 to 10.5.

4,956,107

AMIDE DISPERSANT ADDITIVES DERIVED FROM AMINO-AMINES

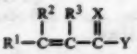
Antonio Gutierrez, Mercerville, and Robert D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 126,405, Nov. 30, 1987, Pat. No. 4,857,217. This application Nov. 10, 1988, Ser. No. 269,461
Int. Cl.[5] C10M 105/72, 105/60
U.S. Cl. 252—47 **37 Claims**

1. An oil soluble dispersant mixture useful as an oil additive comprising an adduct of:

(A) a polymer-substituted C_3 to C_{10} monosaturated monocarboxylic acid producing material formed by reacting an olefin polymer of C_2 to C_{10} monoolefin having a number average molecular weight of about 300 to 10,000 and a C_3 to C_{10} monounsaturated acid material, said acid producing material having an average of at least about 0.5 monocarboxylic acid producing moieties, per molecule of said olefin polymer present in the reaction mixture used to form said acid producing material; and

(B) an amido-amine or a thioamido-amine characterized by being a reaction product of at least a polyamine and an alpha, beta-unsaturated compound of the formula:

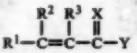


wherein X is sulfur or oxygen, Y is —OR^4, —SR, or —$NR^4(R^5)$, and R^1, R^2, R^3, R^4 and R^5 are the same or different and are hydrogen or substituted or unsubstituted hydrocarbyl.

16. A process for producing a dispersant mixture useful as an oil additive which comprises:

(a) providing a hydrocarbyl substituted C_3 to C_{10} monoolefin having a number average molecular weight of about 700 to 10,000 and a C_3 to C_{10} monounsaturated acid material, said acid producing material having an average of at least about 0.5 monocarboxylic acid producing moieties, per molecule of said olefin polymer present in the reaction mixture used to form said acid producing material;

(b) providing an amido-amine compound having at least one primary amino group prepared by reacting at least one polyamine with at least one alpha, beta-unsaturated compound of the formula:



wherein X is sulfur or oxygen, Y is —OR^4, —SR^4, or —NR^4(R^5), and R^1, R^2, R^3, R^4 and R^5 are the same or different and are hydrogen or substituted or unsubstituted hydrocarbyl;

(c) contacting the said acid producing material with said amido-amine compound under conditions sufficient to effect reaction of at least a portion of the primary amino groups on said amido-amine compound with at least a portion of the acid-producing groups in said acid producing material, to form said dispersant mixture.

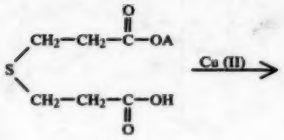
4,956,108

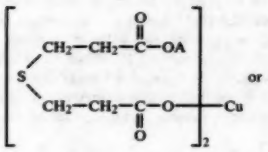
COPPER SALTS OF THIODIPROPIONIC ACID DERIVATIVES AS ANTIOXIDANT ADDITIVES PROCESS OF MAKING THE SAME AND FUEL COMPOSITION THEREOF

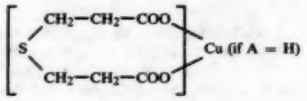
Liehpao O. Farng, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 79,186, Jul. 29, 1987, Pat. No. 4,820,430. This application May 30, 1989, Ser. No. 358,920
Int. Cl.[5] C10M 105/72
U.S. Cl. 252—486 **20 Claims**

1. A process of preparing a copper salt of a thiodipropionic acid derivative comprising reacting molar quantities of Cu (I) or Cu (II) ions in an amount sufficient to make neutral, acidic or basic copper salts in accordance with the below-generalized reaction

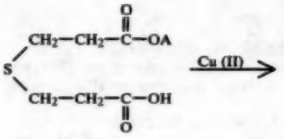


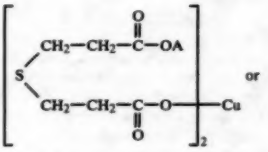


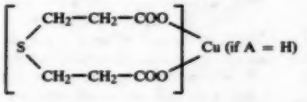


where A is hydrogen or C_1 to about C_{30} hydrocarbyl, and where hydrocarbyl is selected from the group consisting of aralkyl, cycloalkyl, or hydrocarbyl containing unsaturated vinyl or acetylene or hetero groups containing nitrogen, oxygen or sulfur.

19. A product of reaction obtained by preparing a copper salt of a thiodipropionic acid derivative comprising reacting molar quantities of Cu (I) or Cu (II) ions in an amount sufficient to make neutral, acidic or basic copper salts in accordance with the below-generalized reaction







where A is hydrogen or C_1 to about C_{30} hydrocarbyl, and where hydrocarbyl is selected from the group consisting of aralkyl, cycloalkyl, or hydrocarbyl containing unsaturated vinyl or acetylene or hetero groups containing nitrogen, oxygen or sulfur.

4,956,109

LUBRICATING OIL

Keiichi Tanikawa, and Higaki Yuzo, both of Kanagawa, Japan, assignors to The Nisshin Oil Mills, Ltd. and Nippon Steel Corporation, both of Tokyo, Japan

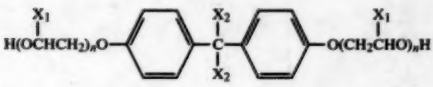
Filed May 26, 1989, Ser. No. 358,697

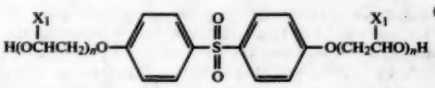
Claims priority, application Japan, May 30, 1988, 63-130449

Int. Cl.[5] C10M *135/08, 129/70*

U.S. Cl. 252—48.6 **1 Claim**

1. A lubricating oil comprising at least one member selected from the group consisting of esterified products obtained by reacting: (A) a compound selected from the group consisting of alcohols represented by the following general formula (I), alcohols represented by the following general formula (II) and hydrogenated derivatives thereof; with (B) a fatty acid having not less than 6 carbon atoms or a mixture of the fatty acid with a rosin selected from the group consisting of rosin, hydrogenated rosins, disproportionated rosins and polymerized rosins:





in the general formulas (I) and (II), X_1 and X_2 each independently represents a hydrogen atom or a methyl group and n is an integer ranging from 0 to 5.

4,956,110

AQUEOUS FLUID

Alain L. P. Lenack, Bonsecours, and Fernand J. Kech, Mont-Saint-Aignan, both of France, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 878,009, Jun. 24, 1986, abandoned. This application Apr. 12, 1988, Ser. No. 180,436

Claims priority, application United Kingdom, Jun. 27, 1985, 8516301; Sep. 16, 1985, 8522841

Int. Cl.[5] C10M *173/00, 129/36*

U.S. Cl. 252—49.5 **79 Claims**

1. An oil and water microemulsion additive concentrate comprising water, oil, emulsifier, and water-soluble hydroxy di- or tri-carboxylic acid, with the proviso that the ratio of oil to emulsifier is no greater than about 2.5:1 by weight.

4,956,111

METHACRYLATE POUR POINT DEPRESSANTS AND COMPOSITIONS

Bruce E. Wilburn, and William J. Heilman, both of Houston, Tex., assignors to Pennzoil Products Company, The Woodlands, Tex.

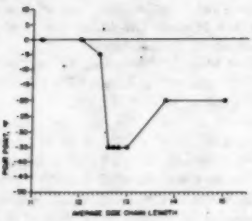
Continuation-in-part of Ser. No. 257,175, Oct. 13, 1988, Pat. No. 4,844,829, which is a continuation of Ser. No. 87,035, Aug. 19, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 301,397

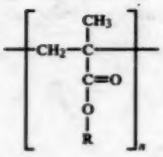
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] G10M *105/22*

U.S. Cl. 252—56 R **27 Claims**

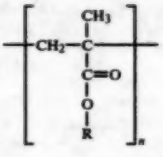
1. A pour point depressant for lubricating oils comprising a poly(methacrylate) polymer having the repeating unit



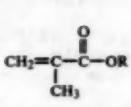


wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, said polymer being a polymer formed from the reaction of at least three but less than five methacrylate monomers with no individual monomer present in an amount of less than 10–15 wt. %.

20. A lubricating oil composition comprising a wax containing hydrocarbon lubricating oil and containing a sufficient amount of a pour point depressant to reduce the pour point to comply with the requirements of a 5W-30, 10W-30, 10W-40 or 15W-40 lubricating oil in combination with a viscosity index improver, said pour point component comprising an effective amount of a poly(methacrylate) polymer having the repeating unit

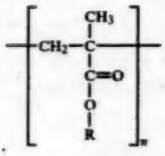


wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, the pour point depressant having been formed by reaction of at least three but less than five methacrylate monomers where each monomer is at least 10–15 wt. % of the mixture having the formula



wherein R is selected from the group consisting of C_{10}–C_{16} alkyl groups, the value of R being chosen so that the average chain length in the polymer of the R group is 12.6–13.8.

26. A method for depressing the pour point of a lubricating oil composition which comprises adding to the lubricating oil a pour point depressing effective amount of a poly(methacrylate) polymer having the repeating unit



wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, said polymer being a polymer formed from the reaction of at least three but less than five methacrylate monomers with no individual monomer present in an amount of less than 10–15 wt. %.

4,956,112

COMPOSITION FOR SOFTENING FABRICS: CLAY SOFTENING AGENT AND NONIONIC SURFACTANT WITH 0°–15° C. CLOUDY PHASE

Ian R. Kenyon, Wirral, England, and Bryan C. Smith, Rotterdam, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,092

Claims priority, application United Kingdom, Apr. 15, 1987, 8709057

Int. Cl.[5] **C11D** *1/66, 3/12;* **D06M** *11/06*

U.S. Cl. 252—8.9 **4 Claims**

1. A particulate composition for softening fabrics from a wash liquor, said composition comprising a fabric softening clay material which is a three-layer swellable smectite clay of the montmorillonite type and a nonionic surfactant system which has a cloudy phase, at 1% concentration in water somewhere, within the temperature range of 0° C. to 15° C., the weight ratio of said clay material to said nonionic surfactant system being from about 2:3 to about 20:1 in which said nonionic surfactant system has an HLB of less than about 9.5.

4,956,113

PROCESS FOR PREPARING A MAGNETIC FLUID

Takao Kanno, Tokyo; Yutaka Koda, Yokohama, and Hirokazu Nagato, Fujisawa, all of Japan, assignors to NOk Corporation, Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,094

Claims priority, application Japan, Feb. 16, 1988, 63-31804; Mar. 8, 1988, 63-52755

Int. Cl.[5] **H01F** *1/28*

U.S. Cl. 252—62.52 **29 Claims**

1. A process for preparing a magnetic fluid which comprises:

(a) dispersing particles of surfactant-adsorbed ferrite having particle sizes of about 50 Å to about 300 Å in a hydrocarbon solvent having a boiling point of about 60° C. to about 200° C. to thereby form a suspension,

(b) admixing said suspension with a N-polyalkylenepolyamine-substituted alkenylsuccinimide,

(c) heating the resulting mixture at a temperature of at least 70° C. to thereby remove said hydrocarbon solvent from said mixture, and recovering particles of N-polyalkylenepolyamine-substituted alkenylsuccinimide-coated ferrite;

(d) admixing said recovered particles of ferrite with:

(1) a base oil having a vapor pressure of not more than 0.1 mm Hg at 25° C., and

(2) a dispersing agent selected from the group consisting of

(i) N-polyalkylenepolyamine-substituted alkenyl succinimide,

(ii) a phosphoric acid ester having a mono- or di-oxyalkylene substituent group, and

(iii) a nonionic surfactant and

(e) subjecting the mixture resulting from step (d) to a dispersion treatment.

4,956,114
SINTERED FERRITE BODY, CHIP INDUCTOR, AND COMPOSITE LC PART

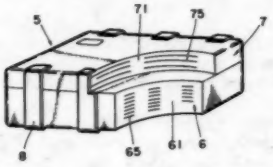
Hideo Watanabe, Chiba; Yoichi Kanagawa, Tokyo; Takashi Suzuki, Ichikawa, and Takeshi Nomura, Matsudo, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,225

Claims priority, application Japan, Jul. 1, 1987, 62-164961; Jul. 1, 1987, 62-164962; Nov. 16, 1987, 62-289095

Int. Cl.[5] **C04B** *35/26, 35/61;* **H01F** *1/00*

U.S. Cl. 252—62.58 **7 Claims**



1. A sintered ferrite body, consisting essentially of:

a nickel based ferrite in combination with from about 15 to about 75% by weight of the body of a borosilicate glass, said borosilicate glass containing about 75 to about 90% by weight of silicon oxide, about 8 to about 20% by weight of boron oxide, 0 to about 5% by weight aluminum oxide, 0 to about 5% by weight of at least 1 oxide of a monovalent metal and 0 to about 5% by weight of at least 1 oxide of a divalent metal, said percentages based on the weight of borosilicate glass.

4,956,115
WATER BORNE SOLVENT STRIPPERS

Michael R. Van De Mark, Rolla, Mo., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed May 23, 1989, Ser. No. 355,508

Int. Cl.[5] **C11D** *7/50, 7/26, 3/43*

U.S. Cl. 252—170 **27 Claims**

1. A stripping composition comprising from about 30 to about 70 wt.% water, from about 5 to about 30 wt.% trioxane, from about 5 to about 20 wt.% surfactant and no greater than about 30 wt.% of said organic cosolvent.

4,956,116
SURFACE-ACTIVE, SATURATED SULFOPHOSPHORIC ACID-(PARTIAL)-ALKYL ESTERS

Bernd Fabry, Korschenbroich; Hans-Herbert Friese, Monheim; Friedrich Pieper, Langenfeld, and Guenter Uphues, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 304,398

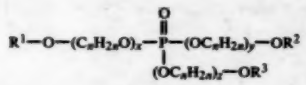
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812718

Int. Cl.[5] **C11D** *3/06, 3/065, 7/16, 11/04*

U.S. Cl. 252—174.16 **11 Claims**

1. A process for producing an aqueous solution of surface-active, saturated sulfophosphoric acid-(partial)-alkyl esters and their alkali metal, alkaline earth, ammonium and amine salts thereof comprising:

(a) providing saturated alkyl, saturated alkyl/saturated alkylpolyoxyalkyl, and/or saturated alkylpolyoxyalkyl-phosphates with iodine numbers between 0 and less than 10, which correspond to general formula I



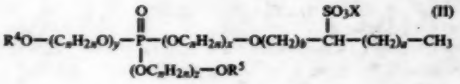
(I)

wherein R^1 represents an alkyl groups with 8 to 22 carbon atoms or a fatty alkyl group consisting predominantly of octyl, decyl, lauryl, myristyl, cetyl, stearyl or behenyl groups, the radicals R^2 and R^3 are the same or different and represent hydrogen, an alkyl group with 8 to 22 carbon atoms or a fatty alkyl group consisting predominantly of octyl, decyl, lauryl, myristyl, cetyl, stearyl or behenyl groups, n is a number from 2 to 4, the subscripts x, y and z are the same or different and represent a number between 0 and 30;

(b) sulfonating the product of step (a) at a temperature of between about 60° C. and about 100° C.; and

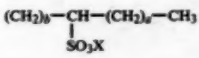
(c) hydrolyzing the sulfonation product of step (b) with a base.

11. An aqueous solution of a mixture of surface-active, saturated sulfophsophoric acid-(partial)-alkyl esters of general formula II



(II)

in which R^4 and R^5 are the same or different and represent hydrogen or



X represents hydrogen, an alkali metal ion, alkaline earth metal ion, ammonium ion or an amine radical, n represents a number from 2 to 4, the subscripts x, y and z are the same or different and represent a number from 0 to 30, a represents a number from 0 to 20 and b represents a number from 0 to 20 with the proviso that the sum for a+b is between about 6 and about 20, prepared by the process of claim 1.

4,956,117
PHENOXYACETATE PERACID PRECURSORS AND PERHYDROLYSIS SYSTEMS THEREWITH

Alfred G. Zielski, Pleasanton, and Ronald A. Fong, Modesto, both of Calif., assignors to The Clorox Company, Oakland, Calif.

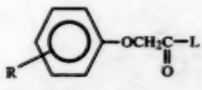
Division of Ser. No. 45,197, Apr. 30, 1987, Pat. No. 4,859,800, which is a continuation-in-part of Ser. No. 927,856, Nov. 6, 1986, abandoned. This application May 19, 1989, Ser. No. 353,970

Int. Cl.[5] **C09K** *3/00;* **C01B** *15/03*

U.S. Cl. 252—186.38 **17 Claims**

1. A perhydrolysis system for in situ generation of peroxyacid comprising:

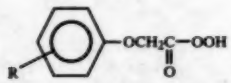
a peroxyacid precursor including at least one α-substituted carbonyl moiety with the structure



wherein R is hydrogen or an alkyl with not more than 5 car-

bons and L is a group whose conjugate acid has a pKa in aqueous solution of between about 5 to about 13; and

a source of peroxygen which will react with the peroxyacid precursor in aqueous solution to form a peroxyacid having the structure



4,956,118

LUBRICATING COMPOSITION CONTAINING ANTI-WEAR/EXTREME PRESSURE ADDITIVES

Sean P. O'Connor, Beverley, England, assignor to BP Chemicals Limited, London, England

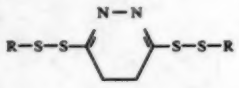
Filed May 17, 1988, Ser. No. 195,099

Claims priority, application United Kingdom, Jun. 2, 1987, 8712931

Int. Cl.[5] C10M *133/40*

U.S. Cl. 544—240 **1 Claim**

1. Compounds suitable for use as extreme pressure (EP)/anti-wear (AW) agents in lubricating oil compositions, which are pyridazines having the formula:



(II)

wherein R is independently either hydrocarbyl or substituted hydrocarbyl.

4,956,119

PARTICULATE DEFOAMING COMPOSITIONS

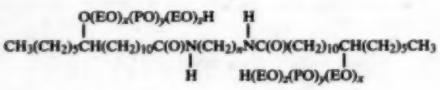
Thomas C. Friel, Jr., P.O. Box 440, Riceboro, Ga. 31323, and Anthony J. O'Lenick, Jr., 4437 Park Dr., Norcross, Ga. 30093

Filed Apr. 20, 1989, Ser. No. 340,752

Int. Cl.[5] B01D *19/04*; C09K *3/00*

U.S. Cl. 252—358 **3 Claims**

1. A defoaming composition containing an effective defoaming amount of a compound which conforms to the following structure;



wherein;

EO is ethylene oxide

PO is propylene oxide

n is an integer from 1 to 10

each x, y, and z are integers from 0 to 20 with the proviso that x+y+z is greater than 0.

4,956,120

POLYARYLALKANE OLIGOMER COMPOSITIONS AND PROCESS FOR THEIR MANUFACTURE

Raymond Commandeur, Vizille, and Bernard Gurtner, Grenoble, both of France, assignors to Atochem, France

Filed Jul. 1, 1988, Ser. No. 214,304

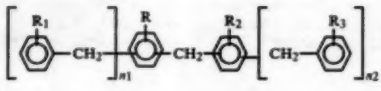
Claims priority, application France, Jul. 16, 1987, 87 10067; Oct. 8, 1987, 87 13912

Int. Cl.[5] B01F *1/00*

U.S. Cl. 252—364 **11 Claims**

1. A polyarylalkane oligomer composition consisting essentially of the mixture of two oligomers, A and B, wherein:

(a) the oligomer A is a mixture of isomers of formula:



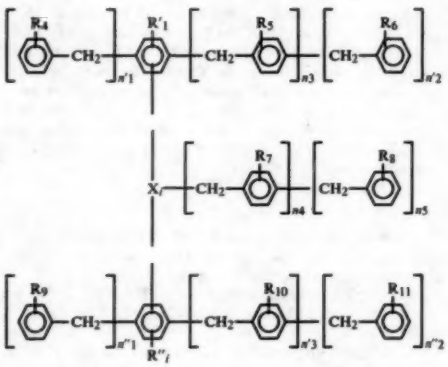
in which:

R is a linear or branched hydrocarbon chain containing n carbon atoms, and n is between 2 and 16,

R_1, $R_2$and R_3 are identical or different and from H or CH3, and

n_1 and n_2 each=0, 1 and 2, and $n_1+n_1+n_2 \leqq 3$;

it being possible for each of the isomers A to have different substituents R, R_1, R_2 and R_3; and (b) the oligomer B is a mixture of isomers of formula:



in which:

R'_i and R''_i are identical or different and have the same meaning as R above,

R_4, R_5, R_6, R_7, R_8, R_9, R_{10} and R_{11} are identical or different and selected from H or CH_3,

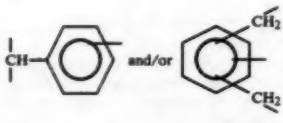
n'_1, n''_1 and n_4=0, 1, or 2,

n'_2, n''_2, n_3, and $n'_3$and $n_5$each=0 or 1,

$n'_1+n''_1+n'_2n''_2+n_3+n'_3+n_4+n_5 \leqq 2$,

i has the value of 1 or 2,

X_i is a trivalent connecting group:



and in which the connections towards the groups

are provided by carbon atoms not forming part of the phenyl group of X_i, each of the isomers B having the same or different substituents R'_i, R''_i, and R_4 to R_{11}.

4,956,121

DIMETHYLACETAMIDE MICA AND VERMICULITE SUSPENSIONS

Thomas M. Tymon, Millersville, Pa., and Albin F. Turbak, Sandy Springs, Ga., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jan. 17, 1989, Ser. No. 296,954

Int. Cl.[5] C04B *33/02, 20/02*

U.S. Cl. 252—378 R **18 Claims**

1. A composition comprising:

a layered silicate selected from the group consisting of mica and vermiculite wherein the said layered silicate further has dimethylacetamidelithium chelation complexes at interlayer cationic sites.

4,956,122

LUBRICATING COMPOSITION

Raymond F. Watts, Califon, N.J.; Frederick C. Loveless, Cheshire, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Continuation of Ser. No. 58,486, Jun. 5, 1987, abandoned, which is a continuation of Ser. No. 901,103, Aug. 28, 1986, abandoned, which is a continuation of Ser. No. 782,233, Sep. 30, 1985, abandoned, which is a continuation of Ser. No. 649,258, Sep. 10, 1984, abandoned, which is a continuation-in-part of Ser. No. 473,841, Mar. 9, 1983, abandoned, which is a continuation-in-part of Ser. No. 356,665, Mar. 10, 1982, abandoned. This application Dec. 23, 1988, Ser. No. 291,382

Int. Cl.[5] C10M *107/10*

U.S. Cl. 252—565 **10 Claims**

1. A lubricating composition comprising:

(a) between 1 and 99 weight percent, based on the weight of components (a), (b) and (c), of a polyalphaolefin having a viscosity of between 40 and 1000 centistokes at 100° C.;

(b) between 0 and 99 weight percent, based on the weight of components (a), (b) and (c), of a synthetic hydrocarbon having a viscosity of between 1 and 10 centistokes at 100° C.;

(c) between 0 and 99 weight percent, based on the weight of components (a), (b) and (c), of a carboxylic acid ester having a viscosity of between 1 and 10 centistokes at 100° C.; and

(d) between 0 and 25 percent by weight of an additive package;

wherein at least 1 weight percent, based on the weight of components (a), (b) and (c), of component (b) and/or (c) is present.

4,956,123

METHOD FOR MANUFACTURE OF FLUORINE-CONTAINING AROMATIC DERIVATIVES

Hideo Sawada, Aichi; Michio Kobayashi, and Masato Yoshida, both of Tokyo, all of Japan, assignors to Nippon Oils & Fats Company, Ltd., Tokyo, Japan

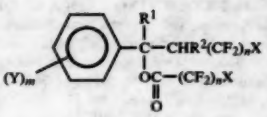
Continuation of Ser. No. 818,811, Jan. 14, 1986, abandoned. This application Sep. 14, 1988, Ser. No. 246,017

Claims priority, application Japan, Jan. 22, 1985, 60-8459

Int. Cl.[5] C07C *67/00, 69/63*

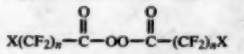
U.S. Cl. 260—408 **13 Claims**

1. A method for the manufacture of a fluorine-containing aromatic compound having the formula (III):



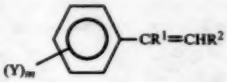
(III)

wherein X is selected from the group consisting of fluorine, chlorine and hydrogen, Y is selected from the group consisting of hydrogen, methyl, ethyl, propyl, acetyl, propionyl, acetyloxy, propionyloxy, methoxy, ethoxy, propoxy, vinyl, isopropenyl, nitro, and halogen; R^1 is selected from the group consisting of hydrogen, methyl, ethyl, propyl and butyl; R^2 is selected from the group consisting of hydrogen, methyl and phenyl; n is an integer of 1–10; and m is an integer of 1–5; which comprises reacting at a temperature of about 0°–50° C., a di(haloacyl)peroxide having the formula (I):



(I)

wherein X and n are as defined above in the formula (III) with an aromatic unsaturated monomer having the formula (II):



(II)

wherein Y, R^1, R^2 and m are as defined in the formula (III).

4,956,124

BICYCLIC DECANEDIOIC ACIDS, A PROCESS FOR THEIR PRODUCTION, AND THEIR USE AS FLOTATION AIDS

Horst Eierdanz, Hilden; Paul Schulz, Wuppertal; Wolfgang von Rybinski, and Rita Koester, both of Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

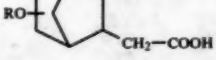
Filed May 11, 1988, Ser. No. 193,304

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715613

Int. Cl.[5] B03C *1/02; C07C 61/13*

U.S. Cl. 260—410 **6 Claims**

1. A bicyclic decanedioic acid corresponding to the formula in which R is



(I)

(a) a linear or branched, saturated C_1–C_{22} alkyl radical, or

(b) a linear or branched, saturated C_3–C_{34} alkylcarbonyl radical, or

(c) a residue of a polyalkoxylated fatty alcohol corresponding to the formula

$$R^1—O—(CH_2—CHR^2—O)_n—CH_2—CHR^2 \quad \text{(II)}$$

in which R^1 is a saturated C_2–C_{22} alkyl group, R^2 is hydrogen, methyl, or both, and n is a number of from 0 to 24.

4,956,125

METHOD FOR EXTRACTING FATS AND OILS

Yoshio Kawamata, Katsuta, and Kiyoshi Iwai, Yokohama, both of Japan, assignors to Showa Sangyo Co., Ltd., Tokyo, Japan

Division of Ser. No. 946,059, Dec. 24, 1986, Pat. No. 4,857,279.
This application May 2, 1989, Ser. No. 348,030
Claims priority, application Japan, Dec. 27, 1985, 60-293921
Int. Cl.[5] C11B 1/10
U.S. Cl. 260—412.8 4 Claims

1. A method of extracting edible fats and oils from an oil bearing animal or vegetable raw material, comprising the steps of:

loading the raw material onto an inlet end of a flat and fixed conveying surface having elongate slits therein;

using scrapers attached to endless chain belts to convey the raw material in the direction of elongation of said slits from said inlet end to an outlet end of said conveying surface; and

extracting oil from the raw material by the repeated steps of:

(a) spraying a distributed oil extracting solvent from a first spray means,

(b) flowing said solvent from said first spray means onto said material on said flat surface, whereby oil is extracted to produce miscella,

(c) collecting in at least one first hopper placed beneath said flat surface, the miscella which has flowed through said slits, and

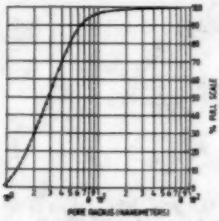
(d) spraying said collected miscella from second spray means placed nearer to said inlet end than are said first spray means.

4,956,126

METAL-OXIDE-SILICA ADSORBENT AND PROCESS FOR REFINING OIL USING THE SAME

Leendert H. Staal, Parkgate, Great Britain; Jan C. Vis, and Jan W. Groeneweg, both of Leyden, Netherlands, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Division of Ser. No. 124,864, Nov. 24, 1987, Pat. No. 4,812,436.
This application Dec. 9, 1988, Ser. No. 282,057
Claims priority, application United Kingdom, Nov. 24, 1986, 8628067; European Pat. Off., Jan. 16, 1987, 872000575
Int. Cl.[5] C11B 3/00, 3/10
U.S. Cl. 260—428 20 Claims



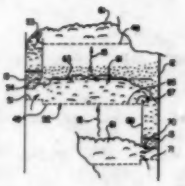
1. A process for refining fatty oil by treatment of the oil with a bleaching solid wherein the bleaching solid comprises an adsorbent which essentially consists of a synthetic calcined metal-oxide-silica, having a surface area at least 40% of which is contained in pores with radius of 2–4 nm and having a specific pore volume in pores with a radius in the range of 100–2000 nm of at least 0.5 ml/g.

4,956,127

DOWNCOMER-TRAY ASSEMBLY AND METHOD

Michael J. Binkley, Glenn Heights; John T. Thorngren; Jorge A. Bonilla, both of Dallas, and Gary W. Gage, Grand Prairie, all of Tex., assignors to Glitsch, Inc., Dallas, Tex.

Filed Mar. 8, 1989, Ser. No. 320,420
Int. Cl.[5] B01F 3/04
U.S. Cl. 261—114.1 19 Claims



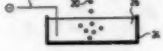
1. An improved downcomer-tray assembly for a process column of the type wherein liquid flows downwardly through the discharge area of a first downcomer onto a first tray and across the active area thereof through which vapor flows upwardly for interaction and mass transfer with the liquid before passing therefrom by a second downcomer, said improvement comprising a substantially uniformly raised active inlet area comprising upwardly extending portions of the tray itself and having gas flow openings disposed beneath said discharge area of said first downcomer for facilitating ascending vapor flow immediately beneath said discharge area of said downcomer by uniformly reducing the height of liquid thereabove relative to the height of liquid above the active area of said tray and injecting said ascending vapor into direct engagement with liquid being discharged from said downcomer.

4,956,128

DROPLET GENERATION

Martin Hommel, Toronto; Anthony M. Sun, Willowdale, and Matthews F. A. Goosen, Toronto, all of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada

Division of Ser. No. 631,471, Jul. 16, 1984, Pat. No. 4,789,550.
This application Nov. 13, 1986, Ser. No. 930,240
Int. Cl.[5] B29B 9/10; C12N 11/04
U.S. Cl. 264—4 16 Claims



1. A method of forming spherical, smooth and uniform microapsules containing living tissue or cells, which comprises:

forming a suspension of living tissue or cells in a physiologically-compatible medium containing a water-soluble substance which can be reversibly gelled to provide a temporary protective environment for the living tissue or cells,

extruding said suspension downwardly from a source at a first location comprising an axially downwardly directed electroconductive needle,

charging the extruded material with a charge of one polarity,

establishing a charge of opposite polarity at a second location spaced vertically below said first location,

providing a difference in voltage between the first location and second location cyclically in pulses of a magnitude from about 1 to about 25 kv at a frequency of about 10 to about 100 sec-1 for a pulse duration of about 1 to about 6 m. sec. to effect continuous production of droplets from the extruded material and to draw the droplets so-formed towards said second location,

collecting said droplets in a recipient medium which is a hardening solution which reacts with said water-soluble substance and form discrete, spherical microcapsules from each of said droplets of diameter less than about 700 microns, and

subsequently forming a permanent biocompatible semi-permeable membrane having a negatively-charged outer surface about each of said microcapsules which forms a core of the resulting spherical, smooth and uniform microcapsules, said membrane permitting nutrients and oxygen to flow to the core material and metabolic products to flow therefrom while retaining the core material within the microcapsule, said membrane comprising ionically-interacted biocompatible materials and having a thickness about 4 to about 6 microns,

said resulting microcapsules being suitable for cardiovascular injection.

4,956,129

MICROENCAPSULATION PROCESS

Herbert B. Scher, Moraga, and Marius Rodson, El Cerrito, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 595,136, Mar. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 499,973, Jun. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 201,686, Oct. 30, 1980, abandoned. This application Feb. 1, 1988, Ser. No. 151,048

Int. Cl.[5] A61K *9/50, 9/52;* B01J *13/02*

U.S. Cl. 264—4.7 **18 Claims**

1. A process for the microencapsulation of a substantially water-insoluble liquid material within a porous shell to effect a slow rate of release of said material through said shell which comprises

(a) providing an organic solution comprising said liquid material and an etherified urea-fonmaldehyde prepolymer dissolved therein in which from about 50% to about 98% of the methylol groups of said prepolymer have been etherified with a C_4–C_{10} alcohol;

(b) creating an emulsion of said organic solution in an continuous phase aqueous solution comprising water and a surface-active agent, wherein said emulsion comprises discrete droplets of said organic solution dispersed in said continuous phase aqueous solution, there being formed thereby an interface between the discrete droplets of organic solution and the surrounding continuous phase aqueous solution; and

(c) causing in situ self-condensation and curing of said urea-formaldehyde prepolymers in the organic phase of said discrete droplets adjacent to said interface by simultaneously heating said emulsion to a temperature between about 20° C. to about 100° C., and adding to said emulsion an acidifying agent and maintaining said emulsion at a pH of between about 0 to about 4 for a sufficient period of time to allow substantial completion of in situ condensation of said resin prepolymers to convert the liquid droplets of said organic solution to capsules consisting of solid permeable polymer shells enclosing said liquid material.

4,956,130

METHOD OF MAKING DENTURES

Lowell F. Sonner, 2100 Superior, Elkhart, Ind. 46516

Filed Nov. 21, 1918, Ser. No. 272,851

Int. Cl.[5] A61C *13/10*

U.S. Cl. 264—18 **7 Claims**

3. A method of forming a denture comprising the steps of:

(a) forming a plurality of false teeth and arranging said teeth in a mold which defines a mold cavity approximating the configuration of a patient's gums and soft mouth tissue;

(b) applying gingival tone dental polymer to said mold cavity at a surface thereof adjacent said false teeth;

(c) characterizing said gingival tone polymer by applying a liquid self-polymerizing curing agent to the gingival tone polymer;

(d) applying a light hued pink polymer to said mold cavity surface adjacent said gingival tone polymer;

(e) characterizing said light hued pink polymer by applying said liquid self-polymerizing curing agent to said light hued pink polymer;

(f) applying a dark pink hued polymer to said mold cavity surface adjacent said light pink hued polymer;

(g) characterizing said dark pink hued polymer by applying said curing agent thereto; and

(h) filling the remainder of the mold cavity with a mixture of said dark pink hued polymer and curing agent to form a base and curing said base.

4,956,131

FUEL CELL ELECTRODE SUBSTRATE INCORPORATING SEPARATOR AS AN INTERCOOLER AND PROCESS FOR PREPARATION THEREOF

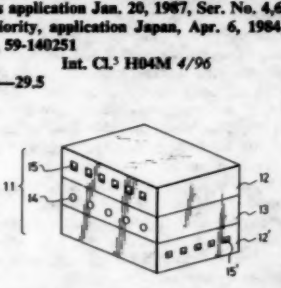
Masatomo Shigeta; Hiroyuki Fukuda; Hisatsugu Kaji, all of Iwaki, and Kuniyuki Saitoh, Abiko, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 718,380, Apr. 1, 1985, Pat. No. 4,664,988. This application Jan. 20, 1987, Ser. No. 4,612

Claims priority, application Japan, Apr. 6, 1984, 59-69870; Jul. 6, 1984, 59-140251

Int. Cl.[5] H04M *4/96*

U.S. Cl. 264—29.5 **23 Claims**



1. In a process for producing an electrode substrate for fuel cells comprising (1) two porous carbonaceous layers, each having a number of elongated holes for feeding reactant gases into a fuel cell which holes are defined near the center of the thickness thereof, and (2) a gas impermeable, carbonaceous separator interposed between said layers,

which process comprises (1) supplying, into a mold having a proper configuration, (i) materials for porous layer each of which is a mixture comprising 10–50% by weight of a filler (A), 20–40% by weight of a binder (B) and 20–50% by weight of a pore regulator (C), (ii) a material for forming the elongated holes for feeding reactant gases and (iii) a material for the separator, (2) press molding the thus supplied materials at a temperature in the range of from 70° to 170° C. and a pressure in the range of from 5 to 100 kg/cm^2 for a time period in the range of from 10 to 60 minutes, (3) postcuring the press molded materials at the molding temperature for at least 2 hours and (4) calcining the postcured materials under an inert atmosphere at a temperature in the range of from 800° to 3,000° C.,

the filler (A) being selected from the group consisting of short carbon fibers and carbon particles, the short carbon fiber having a diameter in the range of from 5 to 30 μm, a length in the range of from 0.02 to 2 mm, and a linear carbonizing shrinkage in the range of not more than 3.0% when calcined at 2,000° C.,

the binder (B) being selected from the group consisting of phenol resins, epoxy resins, petroleum and/or coal pitches

and mixtures thereof, and having a carbonizing yield in the range of from 30 to 75% by weight,

the pore regulator (C) comprising organic granules, 70% or more of which have a particle diameter in the range of from 30 to 300 μm, the organic granule being selected from the group consisting of polyvinyl alcohols, polyvinyl chlorides, polyethylenes, polypropylenes, polystyrenes and mixtures thereof,

the material (ii) for forming elongated holes for feeding reactant gases being a polymer which does not evaporate nor melt-flow at 100° C., the polymer being selected from the group consisting of polyethylenes, polypropylenes, polystyrenes, polyvinyl alcohols and polyvinyl chlorides, having a carbonizing yield of 30% by weight or less and being (1) a textile fabric of the polymer comprising single strand or bundles of a number of strands which have been textured, the strand or the bundle having a diameter in the range of from 0.5 to 3.3 mm, the distance between two strands or bundles parallel to the gas flow direction being in the range of from 1.5 to 5 mm and the distance between two strands or bundles perpendicular to the gas flow direction being in the range of from 5 to 50 mm, or (2) a grating-like shaped article of the polymer prepared by extrusion molding of a melt of the polymer into a die or by press molding of pellets or powder of the polymer in a mold, the gratings having a diameter or equivalent diameter in the range of from 0.5 to 3.3 mm, the distance between two gratings parallel to the gas flow direction being in range of from 1.5 to 5 mm and the distance between two gratings perpendicular to the gas flow direction being in the range of from 5 to 50 mm,

the materials for forming elongated holes for feeding reactant gases being each supplied into the mold so that the elongated holes for feeding reactant gases are parallel to each other and to the electrode surface and one side surface of the electrode, are continuously elongated in the porous layer from one of the other side surfaces to another surface opposite thereto, and the elongated holes in the porous layer on one side of the separator and those in the porous layer on the other side of the separator have the directions perpendicular to one another,

wherein the improvements comprise the process comprising the steps of:

(a) supplying, into the mold having a proper configuration, the material for separator, the material for forming elongated holes for flowing coolant which material is a polymer, and the material for separator, in this order and press molding, or further, after press molding, postcuring and calcining,

the material for separator comprising (i) 50–90% by weight of a filler of carbon particles having a diameter of 50 μm or less and (ii) 10–50% by weight of a thermosetting resin binder; and

(b) supplying, into the mold having a proper configuration, the material for porous layer, the material for forming elongated holes for feeding reactant gases, the material for porous layer, the shaped separator by press molding or the calcined separator prepared in the step (a), the material for porous layer, the material for forming elongated holes for feeding reactant gases, and the material for porous layer, in this order, press molding, postcuring, and calcining the postcured materials to integrate the materials as a whole body to obtain an electrode substrate provided with an intercooler,

where (1) said separator has a number of elongated holes for flowing coolant which are constructed from said separator and provided near the center of the thickness in the separator, and which holes are parallel to each other and to the electrode surface and one side surface of the electrode, are continuously elongated in the separator from one of the side surfaces to another side surface opposite thereto, and have a diameter or equivalent diameter in the range of from 2 to 10 mm, and

(2) said separator excluding the elongated holes for flowing coolant has an average bulk density of 1.2 g/cm^3 or more, a specific gas permeability of 1×10^{-4} cm^2/hr.mmAq. or less, a thermal conductivity of 1 kcal/m.hr.°C. or more, and a volume resistivity of 10×10^{-3} Ω.cm or less.

4,956,132

METHOD FOR APPLYING MOLD-RELEASING AGENT ONTO MOLD SURFACES USING A MOLD-RELEASING SHEET

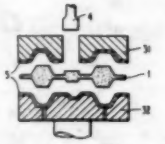
Toshihiko Kitaura; Akio Nakamura; Masayuki Sakamoto; Kouichi Takashima; Kiyotaka Hirakawa, and Matao Mizota, all of Saga, Japan, assignors to Nitto Denko Corporation, Osaka, Japan

Division of Ser. No. 137,282, Dec. 23, 1987, abandoned. This application Nov. 7, 1988, Ser. No. 268,674

Claims priority, application Japan, Dec. 23, 1986, 61-313560; Mar. 16, 1987, 62-61478; Jul. 24, 1987, 62-186374

Int. Cl.^{5} B29C *33/68*

U.S. Cl. 264—39 **1 Claim**



1. A method of applying a mold-releasing agent to molding surfaces of a mold after cleaning said molding surfaces comprising the steps of:

(a) inserting a mold-releasing sheet between said molding surfaces, said mold-releasing sheet comprising a composition containing:

(i) uncured rubber,

(ii) a curing agent, and

(iii) a mold releasing agent,

(b) coating said molding surfaces with said mold releasing agent by heating and pressing said mold-releasing sheet to mold and cure said mold releasing sheet in said mold such that said mold-releasing agent oozes from said mold-releasing sheet and forms a uniform layer on said molding surfaces, and

(c) removing the cured sheet from the molding surfaces of the mold, said uniform layer being sufficient to provide good mold-releasing property to said molding surfaces after said cleaning.

4,956,133

CONTINUOUS MOLDING APPARATUS AND METHOD

Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 202,267, Jun. 6, 1988, which is a continuation-in-part of Ser. No. 890,742, Jul. 30, 1986, Pat. No. 4,749,533, which is a division of Ser. No. 766,498, Aug. 19, 1985, Pat. No. 4,671,753. This application Nov. 16, 1988, Ser. No. 271,686

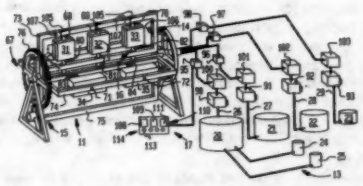
Int. Cl.^{5} B29C *41/06, 41/52, 67/20*

U.S. Cl. 264—39 **30 Claims**

1. Continuous molding apparatus including a raw material supplying portion, a molding portion, a supporting portion, a mixing portion and a control portion; said raw material supplying portion including a plurality of reservoirs, said reservoirs being connected independently with said mixing portion through conduit means; said molding portion including a plurality of spaced enclosed mold assemblies, each of said mold assemblies including at least two separable mold sections and mold section orienting means; said supporting portion including a common rotatable frame section for a plurality of said spaced mold assemblies, support means spaced along said supporting portion for independent rotation of each mold

assembly about at least two axis in a preselected rotational profile, said raw material conduit means being disposed adjacent at least a part of said frame section and communicating with each mold assembly; said mixing portion including an elongated mixing chamber disposed adjacent each mold assembly, a plurality of deflector sections within each mixing chamber spaced along the length thereof; said control portion including pump means, valve means and flow monitoring means disposed along each raw material conduit means, independent drive means for each mold assembly, for said frame section therefor, and for said mold orienting means; programmable memory means and actuating means responsive thereto respectively controlling and activating said pump means, said valve means and said drive means.

20. A continuous molding method including the steps of providing a plurality of raw material reservoirs, continuously moving raw material from each reservoir independently to a plurality of spaced mixing chambers each of which is located



adjacent to an individual enclosed mold assembly including separable mold sections, introducing raw materials into said mixing chambers, passing a freshly formed mixture flowing from each mixing chamber directly into an enclosed cavity of said adjacent mold assembly in a preselected flow rate profile, rotating each mold assembly about at least two intersecting axes in a preselected rotational profile, flowing said mixture over all surfaces of said mold cavity by said rotational movement, continuing said rotational movement of said mold assembly while said mixture forms a foam completely filling said cavity thereof; monitoring the delivery of raw materials to each mixing chamber, the resulting mixture flowing therefrom and the multiple axis rotation of each mold assembly, separating said mold sections of each mold assembly after said foam has formed within said mold cavity, removing a molded foamed product from said separated mold sections, closing said mold sections and repeating said steps to form a multiplicity of such molded products on a continuing basis.

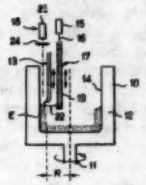
4,956,134

METHOD OF AND APPARATUS FOR CONTROLLING THE FILLING OF A MOLD WITH A PULVERULENT REFRACTORY MATERIAL

Jean-Claude Luc, Avon, France, assignor to Quartz et Silice, Courbevoie, France

Filed Nov. 22, 1988, Ser. No. 274,575
Int. Cl.[5] B29C *39/44*; B29D *24/00*
U.S. Cl. 264—40.2 **14 Claims**

1. A method of controlling the filling of a hollow mold of cylindrical shape with a pulverulent refractory material according to which method grains of material are introduced continuously into the mold, which rotates about its vertical axis, in which the grains are deposited on or near a lateral wall face of said mold in the form of a cylindrical layer having an internal radius R, said method comprising the steps of directing a beam of light in such a way as to form a luminous spot on the summit of the layer, observing the radial displacement of said spot on said summit as the grains are deposited and modifying the height at which the grains are introduced and the height of



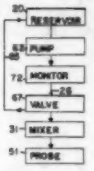
the trajectory of the luminous beam as a function of the radial position of the luminous spot on said summit.

4,956,135

MOLDING APPARATUS AND METHOD

Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 890,742, Jul. 30, 1986, Pat. No. 4,749,533, which is a division of Ser. No. 766,498, Aug. 19, 1985, Pat. No. 4,671,753. This application Jun. 6, 1988, Ser. No. 202,267
Int. Cl.[5] B29C *41/04, 41/52, 67/20*
U.S. Cl. 264—40.7 **26 Claims**



1. Continuous molding apparatus including a raw materiel supplying portion, a mixing portion, a molding portion, a mixture delivery portion, a supporting portion and a control portion; said raw material supplying portion including a plurality of reservoirs; said mixing portion including an elongated chamber, a plurality of spaced deflector sections disposed along the length of said elongated chamber, reservoirs of said raw material supplying portion being independently connected to inlets of said mixing portion through flexible connector means; said molding portion including a plurality of spaced enclosed mold assemblies, each of said mold assemblies including at least two retractable mold sections, and mold section orienting and interlocking means; said mixture delivery portion including a hollow probe member selectively connectable with an outlet of said mixing portion; said mixture delivery portion being selectively alignable with each enclosed mold assembly sequentially in a preselected repeating cycle; said supporting portion including indexing means providing said selective and repeating alignment between said mixture delivery portion and each of said mold assemblies, said supporting portion including support sections rotatably carrying each of said mold assemblies; said control portion including drive means moving said indexing means, said mold section orienting and interlocking means and the rotation of said mold assemblies in a preselected rotational profile, valve means and flow monitoring means disposed along the length of each of said connector means, programmable memory means controlling said drive means and valve means, and actuating means responsive to said memory means activating said drive means and said valve means.

21. A continuous molding method including the steps of positioning a plurality of separable section enclosed mold assemblies in a preselected arrangement with spacing therebetween, axially aligning sequentially a mixture delivery assem-

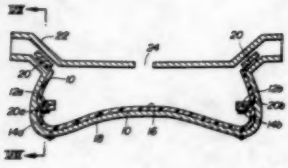
bly with each of said mold assemblies, during each alignment performing the steps of continuously rotating said aligned mold assembly in a preselected rotational profile, dispensing a freshly prepared foamable resin-forming liquid mixture through a probe member disposed in an enclosed cavity of said aligned mold assembly, withdrawing said probe member in a preselected rate profile while continuously dispensing said resinforming mixture therefrom in a preselected flow rate profile, spreading said mixture within said cavity by centrifugal force, continuing said rotation of said mold assembly while said mixture forms a foam therein completely filling said mold cavity, displacing air in said cavity with said foam and exhausting said air along the outside of said probe member, monitoring the delivery of said liquid mixture into said mold cavity and coordinating same with the flow of raw materials, the mold assembly rotation and the withdrawal of said probe member, separating said mold sections of each mold assembly after said probe member is withdrawn completely therefrom, removing a molded foamed resin product from said separated mold sections, closing said mold sections, inserting said probe member therein and repeating said cycle to form a multiplicity of such molded products on a continuing basis.

4,956,136

METHOD OF MOLDING SKIN-COVERED FOAMED PLASTIC ARTICLE

Hisayoshi Mizuno, and Fumio Nara, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Continuation-in-part of Ser. No. 123,472, Nov. 19, 1987, abandoned. This application May 18, 1989, Ser. No. 353,582
Claims priority, application Japan, Nov. 21, 1986, 61-179323
Int. Cl.[5] B29C *67/22*
U.S. Cl. 264—46.6 **12 Claims**



1. A method of molding a skin-covered foamed plastic article which comprises the steps of

(a) preparing a mold which has a cavity formed therein, said cavity having at an inner wall at least one longitudinally curved elongate ridge which extends along the wall;

(b) preparing a bag-shaped skin member which has a stitched portion, said skin member further having at said stitched portion at least one elastically deformable belt connected to said skin member and extending along said stitched portion, said stitched portion sealed at end points of said skin member;

(c) putting said skin member in said cavity, while stretching said belt, in such a manner that said stitched portion of said skin member engages said elongate ridge while being pressed against said elongate ridge by a force produced due to said stretching; and holding said skin member in place against said elongate ridge by contraction of the stretched belt pulling said end points into contact with terminal points of said elongate ridge;

(d) placing a lid on said mold in a manner to close said cavity of the mold;

(e) pouring a liquid foamable material for foamed plastic into said bag-shaped skin member; and

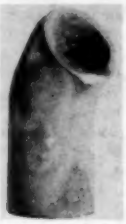
(f) removing, upon sufficient curing of the material, said lid from said mold and taking out from said mold a hardened product of foamed plastic comprising said elastically deformable belt.

4,956,137

POROUS CERAMIC COMPOSITE WITH DENSE SURFACE

Ratnesh K. Dwivedi, Wilmington, Del., assignor to Lanxide Technology Company, LP, Newark, Del.

Filed Sep. 16, 1986, Ser. No. 908,119
Int. Cl.[5] C04B *35/71, 35/02*
U.S. Cl. 264—60 **28 Claims**



1. A method for making a self-supporting ceramic composite article having a porous core bearing a dense surface layer formed integrally with said core, comprising the steps of:

(a) preparing a preform comprising a filler material and a parent metal distributed through said filler material and wherein the volume percent of parent metal is sufficient to form a volume of oxidation reaction product which exceeds the total spatial volume available within said preform;

(b) melting said parent metal in the presence of an oxidant and reacting the resultant molten parent metal on contact therewith to form an oxidation reaction product;

(c) transporting said molten parent metal within said oxidation reaction product towards said oxidant to continue forming oxidation reaction product within said preform thereby substantially filling said total spatial volume, and concurrently forming voids substantially throughout said preform which at least partially inversely replicate the geometry of said parent metal;

(d) continuing said reaction for a time sufficient to transport molten parent metal through said oxidation reaction product towards said oxidant and to at least one surface of said preform to form a dense surface layer of oxidation reaction product on said at least one surface, said dense surface layer being substantially free of voids and

(e) recovering said ceramic composite article.

4,956,138

METHOD OF MANUFACTURING AN ELECTROFUSION COUPLER

Malcolm R. Barfield, Willenhall, United Kingdom, assignor to Glynwed Tubes and Fittings Limited, Connock, United Kingdom

Filed Aug. 12, 1988, Ser. No. 231,343
Int. Cl.[5] B29C *65/02, 65/06*
U.S. Cl. 264—129 **10 Claims**

1. A method of forming an electrofusion coupler, the steps comprising,

applying a heating wire to the outer surface of a tubular preform along its length in the form of a number of spaced apart loops,

covering each loop of the heating wire in thermoplastics material while said heating wire is supported by said support member to completely cover each loop of the wire in said material in a manner to prevent subsequent displacement of the wire relative to the material, and wherein the heating wire is at least partially embedded in said tubular preform due to the surface of the tubular preform becoming melted in the region where the heating wire contacts said tubular preform, and

molding around the material, in thermoplastics material, an outer encapsulating jacket.

4,956,139

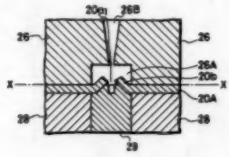
METHOD OF PRODUCING AN EXPOSURE BLADE

Hiroshi Koizumi, Hanno; Hideaki Kawata, Chichibu; Katsumi Arai, Saitama; Koji Miyamoto, Chichibu; Tadaaki Ichikawa, Saitama, and Koji Ogata, Saitama, all of Japan, assignors to Canon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1987, Ser. No. 105,017

Int. Cl.[5] B29C *45/14, 45/36;* B29L *31/0*

U.S. Cl. 264—156 **1 Claim**



1. A method for forming a resin pin member on a blade of an exposure controlling apparatus, comprising the steps of:

providing a mold, the mold including a fixed member having a cavity for injecting resin material into the mold and a movable member slidably supporting an ejector pin, the ejector pin having a projection portion having a slit on the top thereof;

clamping the blade between the fixed member and the movable member of the mold, wherein the projecting portion penetrates the blade into the cavity during said clamping step; and

injecting the resin material into the cavity, the injected resin material flowing through the penetrated portion of the blade and into the slit for embedding the penetrated portion of the blade, the injected resin material forming the resin pin member upon cooling to form the pin member on the blade.

4,956,140

METHODS OF AND APPARATUS FOR PRODUCING BIAXIALLY ORIENTED POLYMER PRODUCT

Rolf Rolles, New Kensington, and Darral V. Humphries, Allentown, both of Pa., assignors to Aluminum Company of America ALCOA Laboratories, Alcoa Center, Pa.

Continuation-in-part of Ser. No. 933,951, Nov. 24, 1986, Pat. No. 4,874,657, Continuation-in-part of Ser. No. 806,994, Dec. 9, 1985, Pat. No. 4,789,514. This application Nov. 8, 1988, Ser. No. 268,405

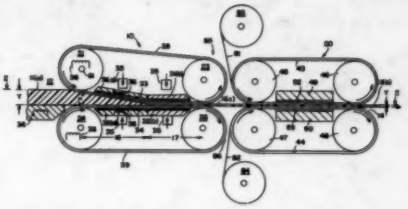
Int. Cl.[5] B29C *42/22, 55/16, 43/16, 43/48*

U.S. Cl. 264—280 **16 Claims**

1. A method of producing biaxially oriented polymer product from solid polymer feedstock material comprising the steps of:

biaxially orienting said polymer feedstock material by introducing the feedstock material between moving opposed isochorically supported belts which converge in a downstream direction, thereby simultaneously elongating the material in a longitudinal direction and spreading the material in a lateral direction while reducing the thickness of the material as the material advances with the converging opposed belts as the belts move in the longitudinal direction;

annealing the material after the material has been reduced in thickness and has assumed its final configuration; and



restraining the material in an isobaric cooling region separate from the isochoric region, also by advancing the material between opposed parallel belts while withdrawing head from the material.

4,956,141

MOLDING PROCESS UTILIZING A MOLD RELEASE MEMBRANE

Thomas E. Allen; James E. Matzinger, and William R. Weaver, all of Toledo, Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Apr. 7, 1989, Ser. No. 335,183

Int. Cl.[5] B29C *33/62, 45/00*

U.S. Cl. 264—297.2 **17 Claims**

2. A process for preparing a molded plastic article utilizing a mold release membrane comprising the steps of:

(A) providing a mold, including at least two cooperating mold sections, having a cavity therein for forming the molded plastic article, wherein at least a portion of the mold cavity defines a mold cavity surface to which a first surface of the mold release membrane is to adhere;

(B) disposing a mold release membrane across the mold cavity surface;

(C) closing the mold;

(D) injecting polymeric precursor materials into the mold cavity behind the membrane, wherein the polymeric precursor materials fill the mold cavity and simultaneously deform the mold release membrane to substantially conform to the mold cavity surface, the polymeric precursor materials reacting in situ adjacent a second surface of the mold release membrane opposite the first surface, to form the molded plastic article;

(E) parting the mold sections, wherein the molded plastic article parts away from the second surface of the mold release membrane, and the first surface of the mold release membrane remains adhered to the mold cavity surface;

(F) removing the molded plastic article from the mold;

(G) closing the mold;

(H) injecting polymeric precursor materials into the mold cavity, wherein the polymeric precursor materials react in situ to form the molded plastic article;

(I) parting the mold sections, wherein the molded plastic

article parts away from the second surface of the mold release membrane, and the first surface of the mold release membrane remains adhered to the mold cavity surface;

(J) removing the molded plastic article from the mold; and

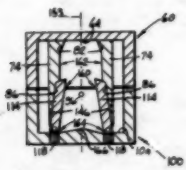
(K) repeating continually steps G, H, I, and J in sequential order, until the mold release membrane ceases to function as a mold release agent.

4,956,142

APPARATUS AND METHOD FOR MOLDING THREE DIMENSIONAL ARTICLES

Peter G. Mangone, Jr., 28600 Buchanan Dr., Evergreen, Colo. 80439

Filed May 8, 1989, Ser. No. 348,515
Int. Cl.[5] B29C *45/36*
U.S. Cl. 264—318 **20 Claims**



1. Method for forming a three dimensional injection molded article having at least one passageway extending therethrough and having at least one internal indentation formed therein using first and second mold parts each of which has an open ended cavity formed therein and having at least an end wall and a plurality of sidewalls comprising:

mounting at least one fixed arm on said end wall of said first mold part and spaced from each of said sidewalls and having a portion thereof projecting out of said cavity and having at least one contoured surface;

mounting at least one movable arm on said end wall of said second mold part for rotation about a fixed axis and having at least one contoured surface adapted to be moved into continuous contacting relationship with said at least one contoured surface of said at least one fixed arm;

moving said first and second mold parts from an opened to a closed position;

injecting material into the cavity formed by said closed first and second mold parts; then

positioning said at least one movable member to form said continuous contacting relationship between said contoured surfaces and forming at least one protruding portion to form said internal indentation; then

continuing said injecting of said material until said cavity formed by said first and second mold parts has been filled;

curing said injected material to form said three dimensional article;

forming said fixed arm so that it can be withdrawn from said cured three dimensional article;

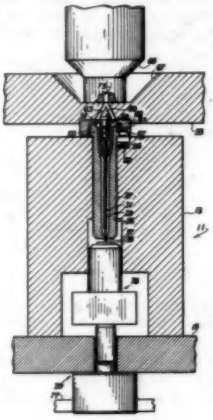
forming said movable arm so that it can cooperate with its rotational movement and be withdrawn from said cured three dimensional article.

4,956,143

METHOD AND APPARATUS FOR THE MULTI-UNIT PRODUCTION OF THIN-WALLED TUBULAR PRODUCTS UTILIZING AN INJECTION MOLDING TECHNIQUE

Richard H. McFarlane, Geneva, Ill., assignor to Taut, Inc., Geneva, Ill.

Continuation-in-part of Ser. No. 25,646, Mar. 13, 1987, which is a continuation-in-part of Ser. No. 496,979, May 23, 1983, abandoned, which is a division of Ser. No. 302,490, Sep. 16, 1981, abandoned. This application Nov. 16, 1988, Ser. No. 271,886
The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.
Int. Cl.[5] B29C *33/30*
U.S. Cl. 264—334 **12 Claims**



1. A method of transferring and processing a plurality of continuously produced molded tubular products formed by a mold cavity and a core pin combined in a specific cavity and core pin pair comprising the steps of:

(a) transferring the combined formed product and cavity and core pin pair as a unit away from a molding site,

(b) separating the mold cavity from the product and still combined core pin,

(c) transferring the combined product and core pin from the locale of separation of the mold cavity therefrom to a local for separation of the product and core pin,

(d) separating the product from the core pin and subsequently transferring the product separated from the core pin and independently therefrom to a collection facility,

(e) concurrently to independently transferring the product, independently transferring the mold cavity and the core pin in segregated relation to one another into a reunited cavity and core pin pair at least at the molding site,

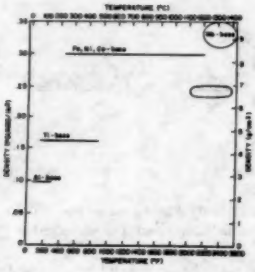
(f) adjusting each reunited cavity and core pin pair immediately prior to receipt of a hot plastic melt therein in accordance with preselected X-Y coordinates relative to the point of introduction of the hot melt into the cavity and core pin pair, and

(g) preselecting a plurality of X-Y coordinates, each in association with individual ones of a plurality of cavity and core pin pairs and thereby regulating inflow and balance characteristics of the hot plastic melt to be injected into each of the plurality of cavities and core pin pairs.

4,956,144
HAFNIUM CONTAINING NB-TI-AL HIGH TEMPERATURE ALLOY

Melvin R. Jackson, Schenectady, and Shyh-Chin Huang, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,394
Int. Cl.[5] C22C 30/00, 27/02
U.S. Cl. 420—580 7 Claims



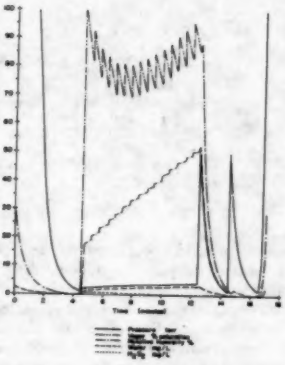
1. An alloy consisting essentially of the following ingredients and ingredient concentrations in atomic percent:

Ingredient	Concentration in Atom % From	To
Niobium	balance essentially	
Titanium	32	45
Hafnium	8	15
Aluminum	3	18

4,956,145
OPTIMUM HYDROGEN PEROXIDE VAPOR STERILIZATION METHOD

Arthur L. Cummings, and Robert W. Childers, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed Dec. 30, 1987, Ser. No. 139,900
Int. Cl.[5] A61L 2/20
U.S. Cl. 422—28 5 Claims



1. A sterilization method comprising:

injecting a hydrogen peroxide and water vapor mixture into a closed sterilization chamber having a predetermined volume at a predetermined temperature in an initial amount approaching the saturation limit of said vapor mixture in said chamber at said temperature and said volume; and,

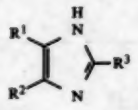
thereafter, injecting a plurality of intermittent make-up injections of said vapor mixture into said chamber, said make-up injections being at a rate and each said make-up injection being in a variable amount necessary to maintain the concentration of hydrogen peroxide vapor at a level effective for sterilization but less than that concentration of hydrogen peroxide vapor which would raise the concentration of said vapor mixture to the saturation limit which will be present in said chamber immediately following injection of such make-up injection at said temperature.

4,956,146
DRY ANALYTICAL ELEMENT AND PROCESS FOR PRODUCING THE SAME

Hirokazu Yuhki; Kazuhiko Fujiwara; Hiroshi Ohnishi, and Fuminori Arai, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 10, 1989, Ser. No. 321,978
Claims priority, application Japan, Mar. 14, 1988, 63-59921
Int. Cl.[5] G01N 33/00, 21/77; C12Q 1/28
U.S. Cl. 422—56 20 Claims

1. In a dry analytical element for use in detecting a specific component contained in a liquid, which element comprises one or more water-permeable layers provided on a water-impermeable support, at least one layer of the water-permeable layers containing a composition capable of interacting with said specific component to produce a leuco dye having formula [I]



[I]

wherein R^1 represents an unsubstituted or substituted aryl group, R^2 represents an unsubstituted or substituted alkyl group, and R^3 represents an unsubstituted or substituted aryl group, the improvement wherein a dispersion containing said leuco dye is incorporated in said at least one layer containing said composition, said dispersion being formed by dissolving said leuco dye and an aliphatic higher alcohol in a hydrophobic solvent and dispersing the resulting solution in a hydrophilic medium.

4,956,148
LOCKING RACK AND DISPOSABLE SAMPLE CARTRIDGE

Cass J. Grandone, Lake Forest, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 41,189, Apr. 22, 1987, abandoned. This application Aug. 28, 1989, Ser. No. 399,365
Int. Cl.[5] G01N 35/00; B65D 83/00
U.S. Cl. 422—64 11 Claims

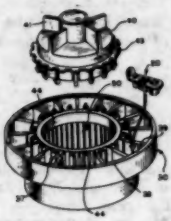
1. An apparatus for use in a biological sample analyzer comprising a plurality of cartridge means for holding fluids, said apparatus further comprising:

indexing rack means having a plurality of openings each of said plurality of openings receiving a one of said plurality of cartridge means;

alignment means in said each of said plurality of openings aligning said one of said plurality of cartridge means in a predetermined orientation in said each of said plurality of openings;

securing means in said each of said plurality of cartridge means in said each of said plurality of openings and thereby securing said each of said plurality of cartridge means against movement from a predetermined position in

said each of said plurality of openings wherein said securing means includes substantially vertical rail means comprising a portion of a surface of said rack means at least partially defining said each of said plurality of openings and engaging at least a portion of the cartridge means in said opening to restrict lateral movement of the cartridge means in said each of said plurality of openings; and actuatable locking means mounted to said rack means and operative upon actuation to simultaneously engage said each of said plurality of cartridge means in said each of said plurality of openings and positioning and locking said each of said plurality of cartridge means in said each of said plurality of openings in said predetermined position in engagement with the securing means in said each of said plurality of openings.



4,956,149

BIOSENSOR DEVICE PROVIDED WITH AN AGITATOR

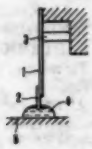
Yoshie Kawana, and Narushi Ito, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jun. 29, 1988, Ser. No. 213,076

Claims priority, application Japan, Jul. 2, 1987, 62-166342

Int. Cl.[5] G01N 27/00

U.S. Cl. 422—68.1 **2 Claims**



1. A biosensor comprising:

an elastic substrate having two ends;

an electrode-type concentration sensor mounted on one end of said substrate; and

a piezoelectric actuator on the other end of said substrate to operate as a vibrator,

said substrate and said piezoelectric actuator being connected so that when said sensor is inserted in a droplet of a solution which is to be measured, a change in the shape of an element of said piezoelectric actuator is amplified by said substrate and transmitted to said sensor, and said sensor measures the concentration of a chemical substance while said sensor agitates the droplet.

4,956,150

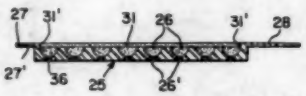
DISPOSABLE MICROTITER STICK

Wayne M. Henry, Scarborough, Me., assignor to Alercbek, Portland, Me.

Continuation of Ser. No. 117,476, Nov. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 803,076, Nov. 27, 1985, abandoned. This application Nov. 15, 1989, Ser. No. 437,770

Int. Cl.[5] G01N 1/10; B01L 3/00

U.S. Cl. 422—102 **9 Claims**



1. A microtiter stick for use in performing immunochemical tests comprising:

a solid plastic body having an upper surface and a row of shallow wells positioned and arranged in said upper surface,

each of said wells being defined by a truncated hemisphere, the bottom of which is an optically clear, circular, transparent, concave surface,

a circular, flat, clear, transparent surface in axial alignment with the concave lens surface of each well creating a planar-concave reducing lens therebetween,

the remainder of the truncated hemisphere being stippled to render said remainder translucent thereby to diffuse light and reduce optical interference and to increase the effective contact surface area of the wells to enhance the ability of the wells to collect residue of the tests for observation.

4,956,151

DEVICE FOR HOLDING TOGETHER AND RELEASING CONICAL JOINTS

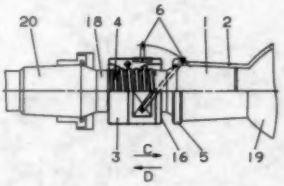
Arnold Steck, Wattwil, Switzerland, assignor to Buchi Laboratoriums-Technik AG, Flawil, Switzerland

Filed Oct. 3, 1988, Ser. No. 252,590

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 8714124[U]

Int. Cl.[5] B01L 11/00; F16L 49/00

U.S. Cl. 422—103 **7 Claims**



1. A device for holding together and releasing conical joints, in particular on laboratory apparatus, comprising a conical pin (1) and conical sleeve (2) having a common central axis and a nut (3), which engages in an outer thread (4) on the conical pin (1), and a tension device disposed on the nut and engaging behind a continuous swelling (5) on the conical sleeve (2), the conical sleeve being pressable against the conical pin by said swelling when the nut is rotated, wherein the tension device is a shackle (6), said shackle being pivotably mounted on the nut (3) about an axis (7) transverse to and at a distance from the central axis, and wherein the nut (3) is divided into two halves in a plane approximately parallel to the central axis and is

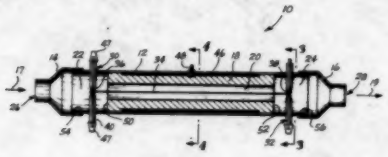
surrounded on its exterior by a detachable clamping device (8), which holds the two halves together on the outer thread.

4,956,152

EMISSION CONTROL UNIT

James R. Keough, Edmonds; Arthur E. Miller, Renton, and Charles R. Schrader, Seattle, all of Wash., assignors to Electro Statics, Inc., Seattle, Wash.

Filed May 10, 1989, Ser. No. 350,125
Int. Cl.[5] F01N 3/15
U.S. Cl. 422—181 **14 Claims**



1. An emission control unit for use in removing certain pollutants, including SO_x and NO_x, from an exhaust gas produced by the combination of fossil fuels, comprising:

a tubular housing having an inlet end portion for receiving said exhaust gas and an outlet end portion for permitting said gas to exit said housing;

a sleeve made of a material including calcium carbonate, said sleeve being received in said housing, said sleeve having an axial opening extending through its length defining a gas flow passageway between said housing's inlet and outlet end portions;

a corona wire axially extending through and substantially along the length of said opening in said sleeve, said corona wire being negatively charged in a manner so as to create an electric field for laterally repelling at least some of said pollutants into said material making up said sleeve;

a positively charged electrode means, received in said housing, and substantially surrounding said sleeve, for attracting said pollutants laterally into said material making up said sleeve; and wherein

said calcium carbonate in said sleeve material chemically reacts with and neutralizes said laterally displaced pollutants, said pollutants chemically altering said material into a substance that is environmentally safe for disposal.

4,956,153

APPARATUS FOR CZOCHRALSKI SINGLE CRYSTAL GROWING

Hirotoshi Yamagishi; Izumi Fusegawa; Shuuji Yokota, and Takao Abe, all of Gunma, Japan, assignors to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,414
Claims priority, application Japan, Sep. 11, 1987, 62-227922
Int. Cl.[5] C30B 15/30, 15/20, 29/06, 35/00
U.S. Cl. 422—249 **6 Claims**

1. An improved apparatus for growing a single crystal of semiconductor silicon by the Czochralski method, comprising:

a graphite receptacle for holding a quartz glass crucible containing a melt of silicon;

a shaft to rotate the graphite receptacle around a vertical axis;

graphite heater elements disposed so as to surround the graphite receptacle;

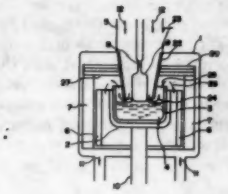
heat-insulating members surrounding the heater elements;

a metal housing enclosing the receptacle, the rotating shaft, the heater elements and the heat-insulating members and having an opening in a top wall thereof;

a conduit gas-tightly joined to the top wall of the housing to open into said opening and extending upwardly;

a heat-resistant and heat-insulating covering board in direct contact with the upper ends of the heat-insulating members and having a circular center opening and heat-insulating covering board having a multilayered structure of an uppermost layer and a lowermost layer of graphite and an interposed layer of a felt of graphite fibers sandwiched between the uppermost layer and the lowermost layer; and

a heat-resistant and heat-insulating graphite cylindrical tube having an outer diameter approximately equal to the



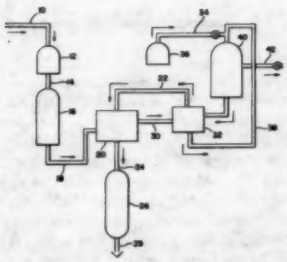
diameter of the center opening in said covering board and gas-tighly joined to said upwardly extending conduit at the top wall of the metal housing and extending downwardly through the center opening in the covering board for axially surrounding a single crystal during growing thereof, the lower end of said tube being spaced above and in the proximity of the surface of the melt in the quartz glass crucible.

4,956,154

SELECTIVE REMOVAL OF CHROMIUM, NICKEL, COBALT, COPPER AND LEAD CATIONS FROM AQUEOUS EFFLUENT SOLUTIONS

Alex Magdics, and Donald B. Stain, both of Lakeland, Fla., assignors to UNC Reclamation, Mulberry, Fla.

Filed Mar. 9, 1988, Ser. No. 166,079
Int. Cl.[5] C01G 31/14; B01D 11/04
U.S. Cl. 423—54 **10 Claims**



1. A process for the selective recovery of hexavalent chromium, cobalt and nickel from an aqueous solution comprising extracting said aqueous solution with an aliphatic amine first extractant to extract hexavalent chromium into the first extractant to form a first pregnant extractant and a barren aqueous solution, stripping the first pregnant extractant with a first alkali metal or ammonium aqueous strip solution to strip hexavalent chromium into the first aqueous strip solution from the first pregnant extractant to form a first barren extractant and a first pregnant strip solution, treating said first pregnant strip solution to recover chromium therefrom, extracting the barren aqueous solution from the first extraction with di-2-ethylhexyl phosphoric acid second extractant so that cobalt and nickel are extracted from the barren aqueous solution to form a second pregnant extractant, stripping the second pregnant extractant

with a second mineral acid aqueous strip solution to form a second barren extractant and a second pregnant strip solution, recycling the second barren extractant to the second extraction, re-extracting the second pregnant strip solution at pH of about 5 to 6 with an organophosphinic acid first re-extractant to extract cobalt into the first re-extractant to form a first pregnant re-extractant and a first barren strip solution, scrubbing the first pregnant re-extractant with cobalt sulfate, stripping the scrubbed first pregnant re-extractant with a third mineral acid aqueous strip solution to recover cobalt, re-extracting the first barren strip solution from the first re-extraction at pH of about 6.5 to 7.5 with an organophosphinic acid second re-extractant to extract nickel into the second re-extractant to form a second pregnant re-extractant, scrubbing the second pregnant re-extractant with nickel sulfate, and stripping the scrubbed second pregnant re-extractant with a fourth mineral acid aqueous strip solution to recover nickel.

4,956,155

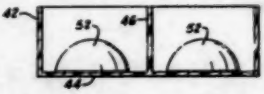
METHOD AND APPARATUS FOR STERILIZING CONTACT LENSES

Michael D. Rohrer, Norman, and Ronald A. Bulard, Oklahoma City, both of Okla., assignors to The Board of Regents of the University of OK, Norman, Okla.

Continuation of Ser. No. 20,375, Mar. 2, 1987, which is a division of Ser. No. 730,381, May 3, 1983, Pat. No. 4,671,935, which is a continuation-in-part of Ser. No. 553,788, Nov. 21, 1983, Pat. No. 4,599,216. This application Mar. 29, 1989, Ser. No. 330,602

Int. Cl.[5] A61L 2/26

U.S. Cl. 422—297 **2 Claims**



1. An apparatus for sterilizing a contact lens in a microwave oven and rehydrating the contact lens with fluid, said apparatus being insertable into a microwave oven having a floor, comprising:

a container constructed of a material which is transparent to microwaves having a bottom, a top, and at least one side wall wherein the bottom and the side wall cooperate to form a retaining space capable of retaining fluid;

means for supporting a contact lens in the retaining space capable of permitting contact between the contact lens and the fluid and capable of preventing any portion of the contact lens from touching another portion of the contact lens;

means for rehydrating the contact lens with fluid after radiating the contact lens with microwaves; and

means for moving the container through various locations of microwave energy levels within the oven in spaced relation from the floor of the oven until the lens is sterilized comprising:

a turntable adapted to rest on the floor of the microwave oven; and

a support comprising an upright portion extending upwardly from the turntable and a transverse portion which extends transversely from the center of the turntable adapted to support the container in spaced relation from a vertical axis through the turntable.

4,956,156

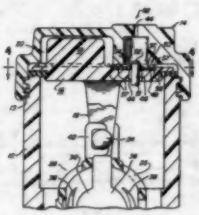
PRESSURE VENTING SYSTEM FOR LENS CASES

Rowland W. Kanner, Guntersville, and Fred E. Williams, Jr., Arab, both of Ala., assignors to Ryder International Corporation, Arab, Ala.

Filed Nov. 7, 1988, Ser. No. 268,053

Int. Cl.[5] A61L 2/18

U.S. Cl. 422—300 **16 Claims**



1. An appliance for disinfecting contact lenses or the like wherein said lenses are disposed within a lens disinfecting solution which produces a gas during the disinfecting action, said appliance comprising: a container having a body with means defining an open end; lens holder means for supporting a pair of contact lenses being disposed within said container body; a removable cap member for closing said container open end; means defining a bore in said cap member providing a passage from an inner surface of said cap member to an outer surface of said cap member; vent means for sealing said bore against entry of contaminants yet permitting escape of gases developed during the disinfecting action, said vent means comprising: a post member positioned in said bore such that said post member does not obstruct passage of gas from inside of said container, a resiliently deflectable apertured diaphragm covering said bore and securely held in place over and around said post member and through which said post member protrudes, with said post member protruding through said diaphragm aperture such that when gas accumulates in said container and when pressure inside the container is greater than a specified threshold pressure, said resiliently deflectable diaphragm resiliently deflects to unseat from said post member to open said vent means, thereby releasing the gas; and when the pressure is relieved such that pressure inside said container is less than a specified threshold pressure, said diaphragm resiliently deflects against said post member to seat thereon and to close said vent means.

4,956,157

PROCESS FOR SEPARATING SALTS IN SEAWATER

Atsushi Nasu, 99 Katako, Yokaichiba-shi, Chiba-ken, Japan

Filed May 30, 1989, Ser. No. 358,158

Claims priority, application Japan, Feb. 20, 1989, 1-40092

Int. Cl.[5] B01D 9/02

U.S. Cl. 423—104 **7 Claims**

1. Process for separating metal salts from seawater comprising:

(a) adding an acid containing sulphate and phosphate ions to the seawater in amount sufficient to lower the pH of the seawater to 2.0 or less;

(b) adding an alkaline agent to the seawater with lowered pH in an amount sufficient to raise the pH of the seawater to 13 or more, thereby forming a first precipitate of metal salts;

(c) separating said first precipitate from the seawater and collecting the remaining seawater as a first solution;

(d) concentrating and cooling said first solution to form a second precipitate of metal salts;

(e) separating the second precipitate and recovering the remaining solution as a second solution; and

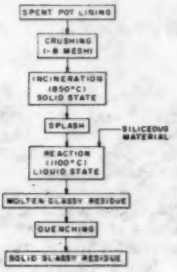
(f) evaporating said second solution to dryness thereby forming a residue of metal salts.

4,956,158

STABILIZATION OF FLUORIDES OF SPENT POTLINING BY CHEMICAL DISPERSION

Quyen C. Nguyen, and Herman J. Hittner, both of Lower Burrell, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 29, 1988, Ser. No. 174,863
Int. Cl.[5] C01F 7/02
U.S. Cl. 423—111 9 Claims



1. A process for treating spent potlining from the electrolytic smelting of aluminum in cryolite comprising:

(a) heating spent potlining to burn carbonaceous material at a temperature low enough to maintain a low fluorine vapor pressure and form an ash;

(b) admixing siliceous material either before or after said ash-forming step;

(c) heating said ash and siliceous material to form a glassy residue suitable for landfill; and

(d) cooling said residue rapidly.

8. A process for providing a spent potlining product characterized by a low leachability of fluorine in water comprising:

(a) incinerating spent potlining at a temperature in the range of about 800–850° C. to form an ash;

(b) mixing said ash with siliceous material;

(c) heating to form a glassy residue suitable for landfill; and

(d) cooling said residue rapidly.

4,956,159

PROCESS FOR RECOVERING GALLIUM TRICHLORIDE FROM GALLIUM-CONTAINING WASTE

Takeyoshi Shibasaki, Kagawa; Etsuji Kimura, Kasukabe, and Yutaka Nishiyama, Yono, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Japan

Continuation of Ser. No. 131,117, Dec. 10, 1987, abandoned. This application Aug. 15, 1989, Ser. No. 394,275
Claims priority, application Japan, Dec. 12, 1986, 61-294914
Int. Cl.[5] C01G 15/00
U.S. Cl. 423—135 4 Claims

1. In a process of recovering gallium tichloride from gallium-containing waste comprising chlorination gallium-containing waste to form a chlorination product including elements of low-boiling-point chlorides contained in the gallium-containing waste, separating and collecting gallium trichloride from the chlorination product by fractional distillation, the improvement comprising carrying out said chlorination of gallium waste initially in the presence of gallium tichloride and simultaneously removing the produced low-boiling-point chlorides of elements contained in the gallium-containing waste.

4,956,160

PROCESS FOR REMOVAL OF HYDROGEN SULPHIDE USING SPECIFIC IRON OXIDES

Günther Reichert, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 25, 1989, Ser. No. 384,622
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826373
Int. Cl.[5] C01B 17/16, 31/20; C02F 1/68
U.S. Cl. 423—231 6 Claims

1. A process for the removal of hydrogen sulphide comprising contacting the hydrogen sulphide with porous iron oxides, in which the iron oxide comprises to the extent of at least 80% by weight of Fe_3O_4 and 20 to 75% of its pore volume is in the form of pores having diameters in the range from 2300 to 5000 Å.

4,956,161

PROCESS FOR REMOVING SO FROM A GASEOUS MIXTURE (OP-3409)

Robert P. Cahn, Millburn, and Boyd E. Hurst, Long Valley, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Jan. 13, 1989, Ser. No. 296,635
Int. Cl.[5] C01B 21/00, 17/00
U.S. Cl. 423—235 23 Claims

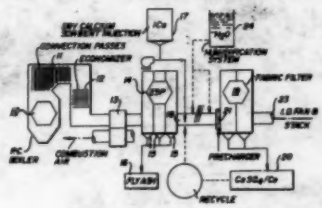
1. A process for removing sulfur oxides from a gaseous mixture containing the same, which comprises contacting, in an absorption zone, at absorption conditions, said gaseous mixture with an aqueous composition comprising an ammonium salt selected from the group consisting of ammonium carbonate, ammonium bicarbonate, and mixtures thereof, in an amount such that the product of the partial pressures of said sulfur oxides and ammonia over said aqueous composition, measured at 140 degrees F., is not greater than about 5 (mm Hg)^2, in said absorption zone, to produce a gaseous product having a decreased content of said sulfur oxides.

4,956,162

PROCESS FOR REMOVAL OF PARTICULATES AND SO_2 FROM COMBUSTION GASES

Wallace B. Smith, Trussville, Ala., and Dan V. Giovanni, Berkeley, Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 874,706, Jun. 16, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 227,269
Int. Cl.[5] B01J 8/00; C01B 17/00, 45/00
U.S. Cl. 423—244 8 Claims



1. A process for removing pollutants, including particulates and SO_2, from coal fired boiler flue gases, said process comprising:

electrostatically removing particulates from the flue gas:

thereafter reducing the temperature of the flue gas to a temperature approaching the temperature for moisture saturation of the flue gas and being less than 135°F. and thereafter injecting dry calcium based sulfur reacting sorbent material into the flue gas in an amount at least

sufficient to react with the SO_2 and SO_3 in the flue gas; and

thereafter filtering the flue gas through a fabric filter to remove the reaction product of the sorbent material and SO_2, as well as unreacted sorbent material, from the flue gas.

4,956,163

METHOD OF FORMING AMIDOPHOSPHATES IN AQUEOUS SOLUTIONS

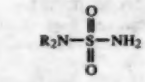
David R. Gard, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jun. 30, 1989, Ser. No. 374,103

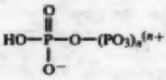
Int. Cl.[5] C01B *21/06, 25/00, 15/16, 25/26*

U.S. Cl. 423—302 **11 Claims**

11. A method of forming an aqueous solution or suspension of amidophosphates comprising reacting together a sulfamide of the formula



where each R is independently selected from the group consisting of alkyl, aryl, substituted alkyl or substituted aryl, hydrogen or a combination thereof, and phosphate ions of the formula



where n is 1, in an aqueous polar solvent selected from the group consisting of water, mixtures of water and dimethlysulfoxide, mixtures of water and a ketone and mixtures of water and an alcohol, at a pH in the range of from about 8 to about 10, at a reaction temperature of from about 30° C. to about 100° C., and at a reaction time of from about 2 h to 300 h.

4,956,164

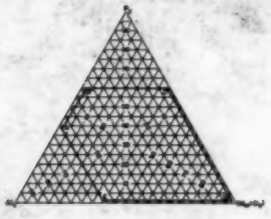
QUINARY MOLECULAR SIEVE COMPOSITIONS

Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 600,168, Apr. 13, 1984, abandoned. This application Jun. 22, 1987, Ser. No. 63,791

Int. Cl.[5] C01B *33/28*

U.S. Cl. 423—306 **7 Claims**



1. Crystalline molecular sieves having three-dimensional microporous framework structures of CoO_2, MnO_2, AlO_2, PO_2 and SiO_2 tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(Co_uMn_vAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the amount of "R" present per mole of $(Co_uMn_vAl_xP_ySi_z)O_2$ and has a value of from zero (0) to about 0.3; and "u", "v", "x", "y" and "z", represent the mole fractions of cobalt, manganese, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides; "w" is the sum of "u+v"; and "w", "x", "y" and "z" are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1 and wherein "u", "v", "x", "y", and "z" are at least 0.01.

4,956,165

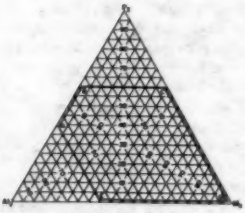
MOLECULAR SIEVE COMPOSITIONS

Brent M. T. Lok, New City; Bonita K. Marcus, Rye; Celeste A. Messina, Ossining; Stephen T. Wilson, Shrub Oak, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 902,020, Sep. 2, 1986, abandoned, which is a continuation of Ser. No. 599,810, Apr. 13, 1984, abandoned. This application May 20, 1988, Ser. No. 196,541

Int. Cl.[5] C01B *25/36*

U.S. Cl. 423—306 **12 Claims**



1. A crystalline molecular sieve having a three-dimensional microporous framework structure of MO_2^n, AlO_2 and PO_2 tetrahedral oxide units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(M_xAl_yP_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "M" represents: (1) titanium, or a mixture of titanium and iron; and (2) at least one element from the group consisting of cobalt, magnesium, manganese and zinc; "n" is 0, −1 or −2; "m" represents a molar amount of "R" present per mole of $(M_xAl_yP_z)O_2$ and has a value of zero (0) to about 0.3; and "x", "y" and "z" represent the mole fractions of "M", aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, said crystalline molecular sieve having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables O, Q, R, S and U.

TABLE O

	(XAPO-37)	
2Θ	D (Å)	Relative Intensity
6.1–6.3	14.49–14.03	vs
15.5–15.7	5.72–5.64	w–m
18.5–18.8	4.80–4.72	w–m
23.5–23.7	3.79–3.75	w–m
26.9–27.1	3.31–3.29	w–m

TABLE Q

2θ	(XAPO-40) D (Å)	Relative Intensity
7.5–7.7	11.79–11.48	vw–m
8.0–8.1	11.05–10.94	s–vs
12.4–12.5	7.14–7.08	w–vs
13.6–13.8	6.51–6.42	m–s
14.0–14.1	6.33–6.28	w–m
27.8–28.0	3.209–3.187	w–m

TABLE R

2θ	(XAPO-41) D (Å)	Relative Intensity
13.6–13.8	6.51–6.42	w–m
20.5–20.6	4.33–4.31	w–m
21.1–21.3	4.21–4.17	vs
22.1–22.3	4.02–3.99	m–s
22.8–23.0	3.90–3.86	m
23.1–23.4	3.82–3.80	w–m
25.5–25.9	3.493–3.440	w–m

TABLE S

2θ	(XAPO-42) D (Å)	Relative Intensity
7.15–7.4	12.36–11.95	m–vs
12.5–12.7	7.08–6.97	m–s
21.75–21.9	4.09–4.06	m–s
24.1–24.25	3.69–3.67	vs
27.25–27.4	3.273–3.255	s
30.05–30.25	2.974–2.955	m–s

TABLE U

2θ	(XAPO-46) D (Å)	Relative Intensity
7.2–8.1	12.3–10.9	vs
21.2–21.8	4.19–4.08	w–m
22.5–23.0	3.95–3.87	vw–m
26.6–27.2	3.351–3.278	vw–w
28.5–29.0	3.132–3.079	vw–w

4,956,166

ZEOLITE L SYNTHESIS

Johannes P. Verduijn, Spijenisse, Netherlands, assignor to Exxon Chemical Patents, Inc., Linden, N.J.

Filed Apr. 20, 1988, Ser. No. 184,546

Claims priority, application United Kingdom, Apr. 22, 1987, 8709506

Int. Cl.[5] C01B *33/28*

U.S. Cl. 423—328 **11 Claims**

1. A process for the preparation of zeolite L, in which an alkaline reaction mixture comprising water, a source of alkali metal, a source of silicon and a source of aluminium is heated to a temperature of from at least 75° C. to form the zeolite L, characterized in that the reaction mixture comprises a source of copper and has a composition falling within the following molar ratios (expressed as oxides):

$(M^1_2O + CuO)SiO_2$	0.18–0.36
$H_2O/(M^1_2O + CuO)$	25–90
SiO_2/Al_2O_3	5–15
$M^1_2O/(M^1_2O + CuO)$	0.900–0.9999

(wherein M^1 is an alkali metal).

4,956,167

SILICAS

Derek Aldcroft, South Wirral; John R. Newton, Cheshire; James P. Quinn, Birkenhead, and Peter W. Stanier, Cheshire, all of United Kingdom, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Continuation of Ser. No. 19,859, Feb. 27, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,392

Claims priority, application United Kingdom, Feb. 28, 1986, 8604985

Int. Cl.[5] C01B *33/18*; A01K *1/16*

U.S. Cl. 423—339 **2 Claims**

1. A method of preparing an amorphous precipitated silica, suitable for use as a toothpaste abrasive, and having

(i) a BET surface area in the range from about 10 to about 450 pl m^2/g,

(ii) a weight mean particle size in the range from about 3 to about 20 microns, and

(iii) a perspex abrasion value in the range from about 23 to about 35, which is produced by the reaction of sodium silicate, having a silica:Na_2O ratio in the range from 1.8 to 3.5:1, with mineral acid at a temperature of about 95° C. to 100° C., with the concentration and volume of the reactants controlled to give a reaction in the pH range from about 10 to about 10.5, in the presence of a water soluble electrolyte comprising a cation selected from the group comprising aluminium, magnesium, calcium, sodium and potassium with an associated anion selected from the group comprising bromide, carbonate, chloride, nitrate, acetate and sulphate wherein the electrolyte:silica weight ratio is from about 0.1 to 1 to about 2 to 1, adding mineral acid to lower the pH to the range of 3.0–3.5, while at least maintaining the reaction temperature and thereafter filtering the resultant slurry and recovering the precipitated silica.

4,956,168

SYNTHESIS OF HYDROXYLAMINE SALTS

Kerry L. Wagaman, Clinton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1983, Ser. No. 470,814

Int. Cl.[5] C01B *21/14*

U.S. Cl. 423—386 **14 Claims**

1. A method for preparing hydroxylamine acid salts which comprises:

preparing a slurry of hydroxylamine sulfate in an alcohol at a temperature not in excess of about 65° C.;

high-shear mixing ammonia with said slurry to form a hydroxylamine-alcohol solution and ammonium sulfate while maintaining the temperature of said slurry at or below 65° C.;

removing ammonium sulfate;

agitating said solution;

admixing an acid selected from the group consisting of nitric acid and perchloric acid with said solution at a temperature not in excess of about 50° C. to form said hydroxylamine acid salt; and

recovering said hydroxylamine acid salt.

4,956,169

PRODUCTION PROCESS OF CHLORINE

Masanobu Ajioka, Yokohama; Shinji Takenaka; Hiroyuki Itoh, both of Omuta; Masafumi Kataita, Houya, and Yoshitsugu Kohno, Omuta, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 169,951

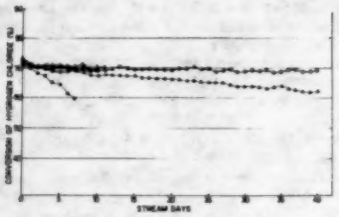
Claims priority, application Japan, Mar. 18, 1987, 62-61332

Int. Cl.[5] B01J *8/24*; C01B *7/04*

U.S. Cl. 423—502 **11 Claims**

1. A process for producing chlorine, which comprises reacting hydrogen chloride and oxygen in the presence of a chro-

mium oxide catalyst in a reactor having a catalyst-contacting part which is lined with alumina, and wherein the catalyst-contacting part of the reactor has been thermally undersprayed with a nickel-chromium alloy and then thermally sprayed with alumina powder.



4,956,170

SKIN MOISTURIZING/CONDITIONING ANTIMICROBIAL ALCOHOLIC GELS

Andrew S. Lee, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Jun. 28, 1989, Ser. No. 372,723
Int. Cl.[5] A61K *7/06*
U.S. Cl. 424—81 **12 Claims**

1. A high alcohol content gel composition with skin moisturizing and conditioning properties comprising

(a) from about 60 to 75 weight percent of ethanol, isopropanol or mixtures thereof;

(b) from about 0.4 to 2 weight percent of a thickening agent which is an addition polymer of acrylic acid crosslinked with an unsaturated polyfunctional agent;

(c) a sufficient amount of a compatible neutralizing agent for thickening agent (b) to neutralize from about 15% to 100% of acrylic acid carboxyl units present in thickening agent (b), said neutralizing agent being selected from the group consisting of amines of the formula $HO(C_mH_{2m})_2NH$ where m has a value of from 2 to 3, aminomethyl propanol, aminomethyl propanediol, and $H(OCH_2CH_2)_xRN(CH_2CH_2O)_yH$ where R is a hydrocarbon radical having from 10 to 18 carbon atoms and the sum of x+y has an average value of from about 5 to 25;

(d) from about 0.5 to 2.5 weight percent of at least one hydrocarbon emollient selected from the group consisting of petrolatum and mineral oil;

(e) from about 0.5 to 2 weight percent of at least one fatty ester emollient;

(f) from about 0.05 to 1 weight percent of at least one compatible surfactant to stabilize the composition;

(g) from about 0.5 to 3 weight percent of at least one fatty alcohol having from 12 to 22 carbons atoms;

(h) from about 1 to 6 weight percent of a humectant selected from the group consisting of water soluble polyhydric alcohols having from 2 to 3 hydroxyl groups; and

(i) the balance comprising water, there being at least about 20 weight percent water present and the gel composition has a viscosity of from about 10,000 centipoise to 100,000 centipoise at 25° C.

4,956,171

TRANSDERMAL DRUG DELIVERY USING A DUAL PERMEATION ENHANCER AND METHOD OF PERFORMING THE SAME

Yunik Chang, Toms River, N.J., assignor to Paco Pharmaceutical Services, Inc., Lakewood, N.J.

Filed Jul. 21, 1989, Ser. No. 384,342
Int. Cl.[5] A61K *9/24*
U.S. Cl. 424—449 **13 Claims**

1. A unit dosage form for co-administering a drug, and a dual permeation enhancer comprising sucrose cocoate and methyl laurate, to a predetermined area of a user's unbroken skin for a predetermined time period comprising a membrane reservoir device comprising:

(a) a backing layer that is substantially impermeable to the passage of drug, sucrose cocoate and methyl laurate, one face of which defines the uppermost exterior surface of said body;

(b) a reservoir layer adjacent and below the opposite face that contains a supply of the drug, sucrose cocoate and methyl laurate said sucrose cocoate being present in an amount from about 5% to 35% on a weight percentage basis and said methyl laurate being present in an amount from about 5% to 20% on a weight percentage basis;

(c) a microporous membrane adjacent and below the reservoir layer through which the drug and the dual permeation enhancer permeate;

(d) a strippable layer, adjacent and below the microporous membrane, that is substantially impermeable to the drug and the dual permeation enhancer; and

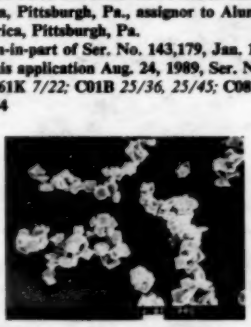
(e) means for attaching said unit dosage form to the user's skin.

4,956,172

AMMONIUM ALUMINUM PHOSPHATE

Chanakya Misra, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 143,179, Jan. 13, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,066
Int. Cl.[5] A61K *7/22*; C01B *25/36, 25/45*; C08K *3/32*
U.S. Cl. 424—54 **15 Claims**



1. Essentially equiaxed crystals of aluminum ammonium phosphate of chemical formula $Al_2(NH_4)OH(PO_4)_2$ plus chemically combined water, having an X-ray diffraction pattern essentially as shown in the Table of Example 1.

8. A process for preparing a novel aluminum ammonium phosphate as claimed in claim 1, comprising reacting aluminum trihydroxide and an ammonium hydrogen phosphate of the formula:

$$(NH_4)_xH_yPO_4$$

wherein x and y are integers of 1 or 2 providing the total of x and y is 3, the reaction occurring at a temperature and pressure effective for producing said novel aluminum ammonium phosphate.

4,956,173

COMPOSITION AND USE OF ADEMETIONINE AGAINST AGEING OF THE SKIN

Gérard Le Fur, Montmorency; Michèle Bousquet, Bievres, both of France; Emilio Crisafulli, Milan, Italy, and Michel Sabadie, Bernay, France, assignors to Societe Anonyme: SANOFI, Paris, France

Filed Nov. 25, 1988, Ser. No. 275,834
Claims priority, application France, Nov. 25, 1987, 87 16349
Int. Cl.[5] A61K 7/48, 31/70
U.S. Cl. 424—63 21 Claims

1. A method of treating the skin of a living human to counteract aging, which comprises applying to the skin a cosmetic or pharmaceutical preparation containing an effective amount of ademetionine or a salt thereof dissolved or dispersed in a cosmetically or pharmaceutically acceptable vehicle for topical administration.

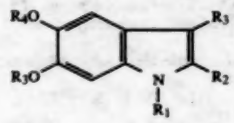
4,956,174

COMPOSITIONS FOR COLORING THE SKIN BASED ON INDOLE DERIVATIVES

Gerard Lang, Saint-Gratien; Herve Richard; Madeleine Leduc, both of Paris, and Alex Junino, Livry-Gargan, all of France, assignors to L'Oreal, Paris, France

Filed Mar. 5, 1987, Ser. No. 21,931
Claims priority, application Luxembourg, Mar. 6, 1986, 86347
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] A61K 7/42
U.S. Cl. 424—63 11 Claims

1. A cosmetic composition for imparting to the skin a coloring which is substantially similar to the pigmentation resulting from natural tanning, said composition comprising, in a cosmetically acceptable medium suitable for topical application to the skin, a compound of the formula



wherein

R_1 represents hydrogen, lower alkyl having 1–6 carbon atoms or $—SiR_9R_{10}R_{11}$,

R_2 and R_3, each independently, represent hydrogen, lower alkyl having 1–6 carbon atoms, carboxyl, lower alkoxy carbonyl wherein the alkoxy moiety has 1–6 carbon atoms or $—COOSiR_9R_{10}R_{11}$,

R_4 and R_5, each independently, represent hydrogen, linear or branched C_1–C_{20} alkyl, formyl, linear or branched C_2–C_{20} acyl, linear or branched C_3–C_{20} alkenoyl, $R_6OSO_2—$, $—SiR_9R_{10}R_{11}$, $—P(O)(OR_6)_2$ or aralkyl, or alternatively,

R_4 and R_5, together with the oxygen atoms to which they are attached, form a ring optionally containing a carbonyl group when at least one of R_1, R_2 or R_3 is other than hydrogen or alternatively a thiocarbonyl group, $>P(O-)OR_6$, $>CR_7R_8$ or methylene,

R_6 represents hydrogen or lower alkyl having 1–6 carbon atoms,

R_7 represents hydrogen or lower alkyl having 1–6 carbon atoms,

R_8 represents lower alkoxy having 1–6 carbon atoms or mono- or dialkylamino, and

R_9, R_{10}, and R_{11}, each independently, represent linear or branched lower alkyl having 1–6 carbon atoms,

with the proviso that at least one of R_1, R_2, R_3, R_4 and R_5, is other than hydrogen and

with the further proviso that when R_1 represents hydrogen, R_2 and R_3, each independently, represent hydrogen or lower alkyl having 1–6 carbon atoms and (1) at least one of R_4 and R_5 represents linear or branched C_1–C_{20} alkyl, linear or branched C_2–C_{20} acyl or linear or branched C_3–C_{20} alkenoyl with the other of R_4 and R_5 being hydrogen, or (2) R_4 and R_5, simultaneously, represent $—SiR_9R_{10}R_{11}$ wherein R_9, R_{10} and R_{11} have the meanings given above,

and with the further proviso that when R_4 and R_5 are simultaneously hydrogen, R_1 is other than lower alkyl and that when R_2 is carboxyl, R_4 and R_5 are not simultaneously linear or branched, C_1–C_{20} alkyl,

and the corresponding salt with an alkali metal, an alkaline earth metal, ammonium or an amine.

4,956,175

N-(MERCAPTOALKYL)OMEGA-HYDROXYALKYLAMIDES AND THEIR USE AS A REDUCING AGENT IN A PROCESS FOR PERMANENTLY DEFORMING HAIR

Jean Maignan, Tremblay les Gonesse; Gerard Lang, Saint Gratien, and Gerard Malle, Villiers sur Morin, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed Aug. 2, 1989, Ser. No. 388,050
Claims priority, application Luxembourg, Aug. 4, 1988, 87310
Int. Cl.[5] A61K 1/09; C07C 235/06
U.S. Cl. 424—72 8 Claims

1. N-(mercaptoalkyl)ω-hydroxyalkylamide having the formula

(I)

wherein

n is 2 or 3, and

m is 2 to 5 inclusive.

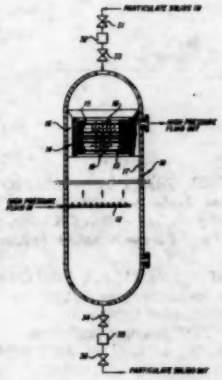
4. A cosmetic reducing composition for the first stage of a permanent deformation operation for hair, comprising in a cosmetically acceptable vehicle, as a reducing agent, at least one N-(mercaptoalkyl)ω-hydroxyalkylamide of claim 1.

4,956,176

SOLIDS-FLUID CONTACTING APPARATUS WITH SCREEN AT FLUID OUTLET

Charles T. Moorman, Harrington Park, N.J., assignor to Kraft General Foods, Inc., Glenview, Ill.

Filed Jun. 20, 1989, Ser. No. 368,714
Int. Cl.[5] A23F 5/00; B01D 11/00
U.S. Cl. 426—478 16 Claims



15. In a method of continuously treating particulate solids

with a treatment fluid under high pressure in a substantially vertical column through which a treatment fluid runs continuously upwardly through a bed of particulate solids in said column and then exits the column through a fluid outlet at the top of the column and through which column particulate solids are pulsed periodically downwardly therethrough, with fresh solids being periodically introduced into the top of the column and treated solids being discharged from the bottom of the column, the treatment fluid in the column being at said high pressure during operation of the column;

the improvement which comprises

mounting a screen in said column, said screen comprising a plurality of vertical screen wires, said screen being located within said column adjacent said fluid outlet and positioned such that all of the fluid passing through the column passes through said screen and thence through said fluid outlet, each pair of adjacent vertical screen wires defining a substantially vertical screen slot therebetween, the opening of each vertical screen slot at the surface of the screen which is upstream in the sense of a fluid flowing through the column and exiting through said outlet during operation of the column, having a width which is designed to screen solids from the exiting fluid and having a length which is several times in width at the upstream surface, whereby the screen is periodically cleaned by the periodic movement of said solids from the top of the column downwardly over the surface of the screen.

4,956,177

METHOD FOR INHIBITING FUNGI

Stephen W. King, Sarasota, Fla.; Geoff G. Fowler, Crewkerne, United Kingdom, and Peter A. Vandenbergh, Sarasota, Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Filed Nov. 4, 1985, Ser. No. 794,468

Int. Cl.[5] **A01N** *63/00*; **C12P** *1/04*; **C12N** *1/20*; **A21D** *2/00*

U.S. Cl. 424—93 **5 Claims**

1. A method of treating a material to inhibit fungal growth which comprises incorporating in or on the material living cells of *Lactobacillus casei* var. *rhamnosus NRRL-B-15972* which produces an antifungal substance and inhibits the fungal growth.

4,956,178

TISSUE GRAFT COMPOSITION

Stephen F. Badylak; Leslie A. Geddes, both of West Lafayette; Gary Lantz, Lafayette, and Arthur C. Coffey, Indianapolis, all of Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

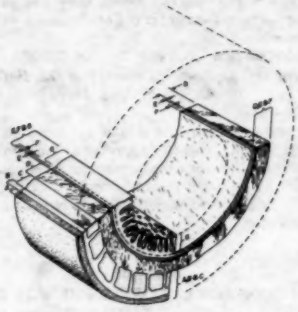
Continuation of Ser. No. 217,299, Jul. 11, 1988, Pat. No. 4,902,508. This application Nov. 6, 1989, Ser. No. 432,591

The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.

Int. Cl.[5] **A61K** *35/38*; **A61F** *2/06*

U.S. Cl. 424—551 **3 Claims**

1. A tissue graft composition comprising the tunica submucosa, the muscularis mucosa and the stratum compactum of the tunica mucosa of a segment of intestinal tissue of a warm-blooded vertebrate, said tunica submucosa, muscularis mucosa and stratum compactum being delaminated from the tunica



muscularis and the luminal portion of the tunica mucosa of said segment of intestinal tissue.

4,956,179

ANTIBACTERIAL COMBINATION OF PENICILLIN AND CEPHALOSPORIN

Peter Bamberg, Zürich, Switzerland; Bertil A. Ekström, Södertälje, Sweden; Ulf E. Forsgren, Södertälje, Sweden, and Berndt O. H. Sjöberg, Södertälje, Sweden, assignors to Astra Lakemedel Aktiebolag and Astra Pharmaceutical Products, Inc., both of, Sweden

Continuation of Ser. No. 589,926, Mar. 15, 1984, abandoned, which is a continuation of Ser. No. 464,157, Apr. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 302,423, Oct. 31, 1972, abandoned. This application Jul. 2, 1987, Ser. No. 69,787

Claims priority, application United Kingdom, Nov. 1, 1971, 50657/71

Int. Cl.[5] **A61K** *35/66*

U.S. Cl. 424—114 **8 Claims**

1. An antibacterial combination consisting essentially of (1) a member selected from the group consisting of 6-((hexahydro-1H-azepin-1-yl)methyleneamino) penicillanic acid and its pharmaceutically acceptable easily hydrolyzable esters and pharmaceutically acceptable salts thereof and (2) a member selected from the group consisting of cephacetrile, cephazoline, cephalotine and cephalexine, and easily hydrolyzable pharmaceutically acceptable esters thereof and pharmaceutically acceptable salts thereof, said members being present in a synergistic combination in a weight ratio of from 10:1 to 1:10.

4,956,180

AB-006 ANTIBIOTICS AND PROCESS FOR THEIR PRODUCTION

Giorgio Cassani, Arluno; Girgio Borgonovi, Milan; Dante Cidaria, Novara; Daniela Tolentino, Milan; Luigi Abis, Novara; Gianfranco Guglielmetti, Bogogno; Carlo Garavaglia, Cuggiono; Giovanni Confalonieri, Monza, and Giorgio Pirali, Saronno, all of Italy, assignors to Presidenza Del Consiglio Dei Ministri, Rome, Italy

Continuation of Ser. No. 213,768, Jun. 30, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 418,928

Claims priority, application Italy, Jul. 8, 1987, 21217 A/87

Int. Cl.[5] **A61K** *35/74*; **C12P** *1/06*

U.S. Cl. 424—118 **12 Claims**

1. AB-006 Antibiotics obtainable by aerobic controlled culture of Streptomyces s.p. NCIB 12425, or of an equivalent mutant thereof, in an aqueous nutrient culture medium containing sources of carbon, nitrogen and inorganic salts until a

substantial antibiotic activity is obtained, and subsequent recovering said antibiotics having the following characteristics:
ultraviolet maximum absorbence of 1.50 at 272 nm;
infrared absorption maxima (cm^{-1}): 3700–3060; 2970; 2930; 2980 (shoulder); 1685; 1635; 1570–1505; 1455; 1435 (shoulder); 1385; 1355–1310; 1255 (shoulder); 1235; 1100; 1085–1000; 975; 875; 850; 820; 750.

4,956,181

NITRATE THERAPY FOR ANGINA PECTORIS

Gerald W. Bayer; Paul A. Diamantopoulos, both of Rochester; Hans W. Osterhoudt, Spencerport, and Paul F. Schmit, Rochester, all of N.Y., assignors to Eastman Kodak, Rochester, N.Y.

Continuation of Ser. No. 47,954, May 8, 1987, abandoned. This application Jun. 7, 1988, Ser. No. 203,774
Int. Cl.[5] A61F *13/40*
U.S. Cl. 424—448 **27 Claims**

1. A transdermal patch for delivering a organic nitrate drug to a patient comprising, in combination:
(i) an occlusive backing layer;
(ii) a rupturable pod reservoir for containing an ointment composition;
(iii) an ointment drug-containing composition disposed within said pod; said composition comprising said drug, a carrier for said drug and an activator liquid activator selected from the group consisting of ethanol, propanol, isopropanol, isobutanol, hexanol, octanol, decanol, dodecanol, ethylene glycol, propylene glycol, 1,3-propanediol, glycerin, ethyl, acetate, isopropyl myristate, lauryl myristate, decyl propionate, bis(2-ethylhexyl) phthalate, bis-(2-ethylhexyl) sebacate, di-n-butyl sebacate, diisopropyl adipate, mineral oil, bis(n-octyl) phthalate, cetyl alcohol, dibutyl phthalate, diethyl sebacate, ethyl lactate, ethyl phthalate, glycerol monostearate, glycerol distearate, glycerol tristearate, isopropyl palmitate, isopropyl stearate, N,N-bis(2-hydroxyethyl)dodecanamide, lauric myristic monoethanolamide, lauryl lactate, myristyl alcohol, n-decyl methylsulfoxide, N,N-dimethylacetamide, oleyl alcohol, phenylethyl alcohol, sodium lauryl sulfate, sodium stearate, stearyl alcohol, wood alcohols, 1,2,6-hexanetriol, water, and 2-amino-2-methyl-1-propanol;
(iv) a barrier polymer film that is inherently resistant to the passage of said drug therethrough but becomes permeable to said drug by action of said activator liquid in said drug composition; and
(v) a non-irritating pressure-sensitive adhesive layer that is permeable to said drug.

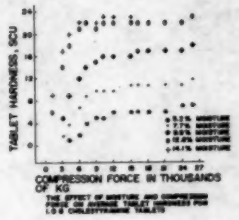
4,956,182

DIRECT COMPRESSION CHOLESTYRAMINE TABLET AND SOLVENT-FREE COATING THEREFOR

Robert J. Bequette; Bruce A. Bonenberger, both of Evansville; Claude E. Gallian, Newburgh, and John R. Reckelhoff, Evansville, all of Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Mar. 16, 1989, Ser. No. 324,167
Int. Cl.[5] A61K *9/42*
U.S. Cl. 424—476 **8 Claims**

1. A cholestyramine tablet comprising:
(a) a directly compressed inner core of cholestyramine agglomerates, said agglomerates having a tapped bulk density of 0.45 to 0.5 g/mL and a moisture content of 8 to 14 percent and formed from many small irregularly-shaped, jagged-edge particles with relatively few large smooth or flat surfaces wherein aid agglomerates when directly compressed provide an inner core having a hardness of 18 to 26 SCU; and



(b) an outer solvent-free coating containing from about 60 to 95 percent by weight of stearic acid, and from about 5 to 40 percent by weight of polyethylene glycol.

4,956,183

COMPOSITION COMPRISING COPPER COMPOUND

Yoshiaki Miki, Yokohama, and Tsunehisa Ueda, Zushi, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Aug. 6, 1987, Ser. No. 82,346
Claims priority, application Japan, Aug. 7, 1986, 61-186066
Int. Cl.[5] A21N *59/20*
U.S. Cl. 424—630 **13 Claims**

1. A deodorant composition comprising a mixture of a copper compound selected from the group consisting of inorganic acid salts of copper and complexes of copper, and oxocarboxylic acid compound having from 2 to 8 carbon atoms and at least one aldehyde or keto group and at least one carboxyl group in the molecule, the amount of oxocarboxylic acid compound in said mixture being from 0.2 to 100 moles, per mole of the copper ion in the copper compound.

4,956,184

TOPICAL TREATMENT OF GENITAL HERPES LESIONS

Robert D. Kross, Bellmore, N.Y., assignor to Alcide Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 190,798, May 6, 1988, abandoned. This application Jun. 3, 1988, Ser. No. 202,758
Int. Cl.[5] A61K *31/19*
U.S. Cl. 424—661 **5 Claims**

1. A method for the topical treatment of genital herpes lesions comprising topically applying to a patient having the condition a pharmaceutically effective amount of a composition comprising a mixture of a first solution, cream, or gel consisting essentially of a chlorine dioxide liberating compound and a second solution, cream or gel consisting essentially of a protic acid, wherein the pK of the protic acid is from about 2.8 to about 4.2.

4,956,185

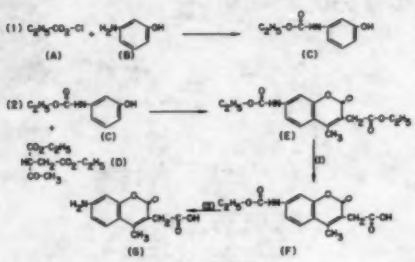
INSTANT YOGURT COMPOSITION AND PROCESS

Stanley Cajigas, Toms River, N.J., assignor to Milpak Inc., Pine Brook, N.J.

Filed Apr. 26, 1989, Ser. No. 344,361
Int. Cl.[5] A23C *9/13*
U.S. Cl. 426—43 **8 Claims**

1. A powdered yogurt formulation, which can be reconstituted into either a yogurt meal or a yogurt liquid drink, consisting essentially of:

about 10–45% by weight of dehydrated yogurt powder;
about 0.001–1.0% by weight of a Lactobacillus culture;
about 10–30% by weight of a whey; and



about 0.1–20% by weight of a mixture of locust bean gum and xanthan gum.

4,956,186

PROCESS FOR THE PRODUCTION OF LOW CALORIE YOGURT

Paul J. Streiff, Camillus; David L. Hoyda, Baldwinsville, and Edward Epstein, Manlius, all of N.Y., assignors to Borden, Inc., Columbus, Ohio

Filed Oct. 25, 1989, Ser. No. 427,185
Int. Cl.[5] A23C *9/133, 9/137;* A23L *1/236*
U.S. Cl. 426—43 **26 Claims**

1. A process for preparing reduced calorie, essentially lactose free, artificially sweetened yogurt product comprising:

(a) concentrating skim milk by ultrafiltration whereby at least a portion of the lactose passes through into a permeate fraction and whereby the lactose level in a retentate fraction is decreased;

(b) adding a lactase enzyme to the retentate fraction of step (a);

(c) culturing the product of step (b) by adding a sufficient amount of a yogurt starter culture to the product, and allowing the mixture to incubate until the pH of the mixture is less than about 4.9;

(d) adding an artificial sweetener to the cultured mixture of step (c).

4,956,187

PROCESS FOR PREPARING IRON ENRICHED FOOD PRODUCTS

Reisaburo Ishigaki, Numazu, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP87/00249, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO87/06103, PCT Pub. Date Oct. 22, 1987
PCT Filed Apr. 20, 1987, Ser. No. 269,179
Claims priority, application Japan, Apr. 19, 1986, 61-90899; Jan. 23, 1987, 62-13680
Int. Cl.[5] A23L *1/20, 1/214*
U.S. Cl. 426—46 **19 Claims**

1. A process for the preparation of an iron enriched food product comprising the steps of:

(a) hydrolyzing a substrate comprising pulverized soybeans, pulverized carrots or a mixture thereof with an effective hydrolyzing amount of a saccharide decomposing enzyme at a temperature between 10° C. to 90° C. for a period between 10 minutes to 5 hours to form a hydrolyzate and

(b) inoculating said hydrolyzate with an effective amount of yeast for cultivation in the presence of an effective amount of an iron compound to enrich said food product at a temperature between 5° C. to 50° C. for a period between 30 minutes to 4 days to form a culture to prepare the desired food product.

4,956,188

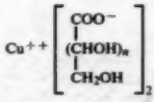
COPPER COMPLEXES WITH ALPHA HYDROXY ORGANIC ACIDS AND THEIR USE AS NUTRITIONAL SUPPLEMENTS

Michael D. Anderson, Minnetonka, Minn., assignor to Zinpro Corporation, Chaska, Minn.

Division of Ser. No. 260,023, Oct. 20, 1988. This application Aug. 7, 1989, Ser. No. 390,404
Int. Cl.[5] A23K *1/00*
U.S. Cl. 426—74 **2 Claims**

1. A method of assuring adequate dietary requirement for growth and production of copper in a bioavailable from, comprising:

adding as a feed ration supplement to the animals' feed, a small but effective amount of a copper complex salt of the formula:



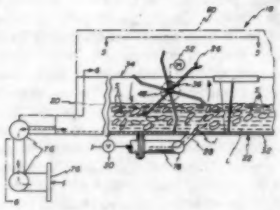
wherein n is from 1 to 5 to provide a dietary intake of copper of at least from about 0.2 parts per million to about 2.0 parts per million.

4,956,189

POTATO CHIP PRECOOKING METHOD

Norman B. Johnson, Dayton, Ohio, assignor to Mike-Sell's Potato Chip Co., Dayton, Ohio

Division of Ser. No. 164,934, Mar. 7, 1988, Pat. No. 4,867,049. This application Jun. 14, 1989, Ser. No. 366,563
Int. Cl.[5] A23L *1/217*
U.S. Cl. 426—233 **9 Claims**



1. A method of precooking a food product, comprising the steps of:

producing a moving stream of heated precooking liquid having a temperature within a desired range of 200 to 300 degrees F. at an upstream end of the stream;

introducing thin slices of unwashed raw potatoes enveloped in natural starch coating into the upstream end of the precooking liquid stream;

partially damning the precooking liquid stream and the potato slices carried therein by providing a plurality of paddle wheels rotatably mounted at multiple spaced apart sites along the stream in order to control the level of liquid therein and the degree of precooking of the slices therein; individually controlling the damning action of each of said paddle wheels by providing individual height adjustment of each paddle wheel relative to the level of the stream of liquid; and

injecting heated precooking liquid into the stream adjacent to said spaced apart sites in order to maintain the temperature of said liquid within the desired range along the stream and concurrently to disperse and thereby prevent accumulation of the starch-coated potato slices at said

sites as a result of said partial damming of the stream at said sites.

4,956,190

TEMPERING AND MILLING OF EDIBLE GRAINS AND LEGUMINOUS MATERIALS WITH REDUCING AGENTS AND METHODS OF MAKING ALIMENTARY PRODUCTS

Dhyaneshwar B. Chawan, Liverpool; Carleton G. Merritt, Phoenix, both of N.Y., and Radwan H. Ibrahim, Crystal, Minn., assignors to Borden, Inc., Columbus, Ohio

Filed Apr. 24, 1989, Ser. No. 342,236

Int. Cl.[5] H23L *1/16, 1/272*

U.S. Cl. 426—269 20 Claims

1. A method for producing an alimentary paste comprising:

(a) tempering edible grains or leguminous material in the presence of a reducing agent selected from the group consisting of sulfhydryl substances, hydrogen sulfide, sulfur dioxide, cysteine, glutathione, and the alkali salts of sulfite, bisulfite, and metabisulfite; by contacting the grains or material with the reducing agent;

(b) milling the tempered grains or material to produce a flour; and

(c) mixing the flour with water to produce an alimentary paste.

4,956,191

METHOD OF PREPARING A CARBONATED BEVERAGE CONTAINING ASPARTAME

Shinji Ueda, and Koichi Takizawa, both of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation of Ser. No. 30,386, Mar. 26, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,603

Claims priority, application Japan, Apr. 1, 1986, 61-74834

Int. Cl.[5] A23L *2/40*

U.S. Cl. 426—330.3 6 Claims

1. A method of retaining dissolved carbon dioxide gas in a packaged liquid carbonated beverage containing aspartame as a main sweetening component, the method comprising adding 5–50 mg/dl of a cold water-soluble natural gum selected from the group consisting of ghatti gum, gum arabic, guar gum, tamarind gum, xanthan gum, carragheenan gum and a combination thereof.

4,956,192

PROCESS FOR OBTAINING NATURAL VANILLA FLAVOR BY TREATMENT OF GREEN VANILLA BEANS, AND THE FLAVOR OBTAINED

Gwenaele Annaldi, Marseille; Gérard Gil, Aubagne, and Jean Le Petit, Allauch, all of France, assignors to Societe Nationale Elf Aquitaine, Courbevoie, France

Filed Aug. 3, 1989, Ser. No. 388,807

Claims priority, application France, Aug. 3, 1988, 88 10473

Int. Cl.[5] A23L *1/221*

U.S. Cl. 426—425 3 Claims

1. A process for enhancing a natural vanilla favor, comprising:

freezing mature green vanilla beans at a temperature between −5° C. and −30° C.;

thawing the frozen beans at a temperature from about 20° C. to about 60° C.; and then

extracting the flavor constituents from the beans.

4,956,193

EDIBLE PLASTIC DISPERSION

Frederick W. Cain, Voorburg, Netherlands; Allan H. Clark, Clapham, Great Britain; Patrick J. Dunphy, Wellingborough, Great Britain; Malcolm G. Jones, Stevington, Great Britain; Ian T. Norton, Rushden, Great Britain, and Simon B. Ross-Murphy, Bedford, Great Britain, assignors to Lever Brothers Company, New York, N.Y.

Filed Jul. 5, 1988, Ser. No. 215,009

Claims priority, application United Kingdom, Jul. 8, 1987, 8716111

Int. Cl.[5] A23L *1/04*

U.S. Cl. 426—573 15 Claims

1. Edible plastic dispersion not having a continuous fat phase, including at least condensed phases, at least one of which is continuous, which dispersion comprises

(I) 0.1 to 99 wt. % of gel forming composition (A) containing 1–8 times the critical concentration of a gelling agent (a) selected from the group consisting of gelatin, kappa-carrageenan, iota-carrageenan, alginate, agar, gellan, pectin and mixtures thereof, and

(II) 1–99.9 wt. % of gel-forming composition B containing 1–8 times the critical concentrations of a gelling agent (b) selected from the group consisting of gelling starch, denatured whey protein, denatured bovine serum protein, denatured soy protein, microcrystalline cellulose and mixture thereof.

4,956,194

METHOD FOR ACCELERATING THE AGING OF DISTILLATES

Bart Gos, 43 Cass St., Springfield, Mass. 01104

Filed Feb. 21, 1990, Ser. No. 483,441

Int. Cl.[5] C12H *1/22*

U.S. Cl. 426—592 16 Claims

1. A method of accelerating the aging of distillates in wooden barrels comprising the steps of:

(a) adding a distillate to a wooden barrel;

(b) adding an amount of tree bark in a sufficient quantity to accelerate the aging of said distillate; and

(c) aging said mixture of distillate and oak bark for a period of time;

(d) whereby said distillate after said aging step approximates the taste and quality of a distillate aged 10 to 12 years without an addition of a tree bark.

4,956,195

HOP FLAVORS WHEREIN DELETERIOUS ODOR-FORMING IMPURITIES HAVE BEEN REMOVED

Paul H. Todd, Jr., James A. Guzinski, both of Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalamazoo, Mich.

Division of Ser. No. 34,917, Apr. 3, 1987, Pat. No. 4,778,691. This application May 19, 1988, Ser. No. 196,145

Int. Cl.[5] C12C *9/02*

U.S. Cl. 426—600 5 Claims

1. A flavoring agent selected from unreduced and reduced alpha acids and isoalpha acids, which is essentially odor-causing-impurity free and which therefore has a more reproduceable and acceptable flavor and aroma, produced by separation from an aqueous solution thereof containing undesirable odor-forming impurities at a pH above 4.

4,956,196

METHOD FOR PRODUCING A CORROSION-RESISTANT COATING ON THE SURFACE OF LACQUERED WORKPIECES

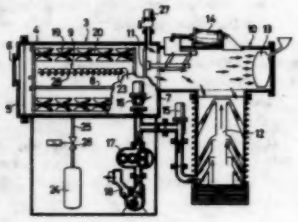
Wolfgang Wagner, Neuberg; Klemens Ruebsam, Jossgrund; Helmut Kubik, Hesselroth; Stefan Heimrich, Bad Orb; Klaus Eckert, Hanau, and Werner Pflueger, Hammersbach, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Continuation of Ser. No. 133,567, Dec. 16, 1987, abandoned. This application Jul. 14, 1989, Ser. No. 380,674

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731686

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—38 **4 Claims**



1. A method for producing a corrosion-resistant coating of high reflectivity on the surface of a plastic reflector insert comprising placing in a vacuum chamber, which contains a flow discharge cathode and thermal evaporator, a plastic reflector insert, the exposed surface of which contains a first coat consisting of a protective lacquer which was applied prior to treatment in said vacuum chamber, evacuating said chamber and subjecting said exposed lacquered surface on said plastic reflector insert to an intensive glow discharge to physically clean the surface thereof and improve adhesion, applying a second coat of hexadimethylsilane polymer onto the lacquer surface comprising said first coat, said polymer being formed by means of a plasma formed by admitting monomer into said vacuum chamber from an external source, then further evacuating said chamber to a vacuum sufficient to achieve vapor deposition and thereupon, using said thermal evaporator, applying a third coat of aluminum metal onto the exposed surface of said hexadimethylsilane polymer second coat and thereafter applying a fourth coat of hexadimethylsilane polymer equal in composition to said second coating onto the surface of said aluminum metal third coat.

4,956,197

PLASMA CONDITIONING OF A SUBSTRATE FOR ELECTROLESS PLATING

Suryadevara V. Babu, Potsdam, N.Y.; Neng-Hsing Lu, Berkeley Heights, N.J., and Gerald W. Jones, Johnson City, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 923,291, Oct. 27, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 253,321

Int. Cl.[5] C23C *18/04;* **B05D** *3/06, 3/04*

U.S. Cl. 427—39 **15 Claims**

1. A method for improving the retention of colloidal catalyst on at least one preconditioned surface having active sites of a dielectric substrate material for the electrodes plating of a conductive metal thereon wherein said dielectric substrate includes an epoxy having polar groups that are reactive with ammonia or amines which comprises exposing said preconditioned substrate to a gaseous plasma from a gas selected from the group of ammonia, organic amines, or mixtures thereof; and then activating the substrate by contacting it with a composition containing a colloidal catalyst to provide directly, or as a precursor leading to catalytic sites capable of electroless plating, initiation of a conductive metal thereon whereby said exposing increases the retention of said colloidal catalytic sites on said at least one preconditioned surface.

4,956,198

ULTRAVIOLET-CURABLE CATIONIC VINYL ETHER POLYURETHANE COATING COMPOSITIONS

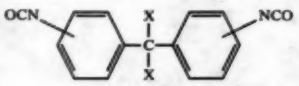
Sami A. Shama, Hoffman Estates; Erwin S. Poklacki, Arlington Heights, and John M. Zimmerman, Hoffman Estates, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Sep. 13, 1988, Ser. No. 243,794

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—54.1 **3 Claims**

1. A method of coating a substrate comprising applying a film having a thickness of from 1 to 10 mils of a substantially hydroxy-free liquid, ultraviolet-curable composition comprising cationically polymerizable ethylenically unsaturated material including a vinyl ether terminated polyurethane which is the reaction product of a monohydric vinyl ether and an isocyanate-reactive polyol or polyamine selected from the group consisting of polycaprolactone glycol, poly(1,6-hexanediol carbonate), trimethylol propane and polyoxypropylene diamine and a diisocyanate having the formula:



in which X is an alkyl group containing from 1–4 carbon atoms or hydrogen and a cationic photoinitiator, and exposing said film to ultraviolet light to cure the same.

4,956,199

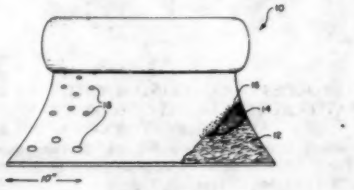
METHOD OF MAKING ROOFING PLIES, INCLUDING METHOD OF APPLYING THE SAME TO A ROOF

Santo J. Ruisi, 10 Dunton Ave., Deer Park, N.Y. 11729

Filed Sep. 7, 1989, Ser. No. 404,260

Int. Cl.[5] B05B *3/02*

U.S. Cl. 427—173 **7 Claims**



1. A method for making a roofing sheet comprising providing a substantially endless length of fiberglass mat, feeding said mat through a punching die and punching a plurality of openings through said mat along the length of one side edge of said mat and extending toward the opposite side edge for about ⅓ of the width of the mat, saturating said mat with melted asphalt at a temperature of at least about 450 degrees F. while simultaneously mildly stretching said mat to impart an elastic memory to said mat, applying granular mineral material to said heated saturated mat, and cooling said saturated mat.

4,956,200

TEXTURING A MOLD SURFACE

Paul Malkowski, Reisterstown, Md., assignor to The Burns & Russell Company, Baltimore, Md.

Filed Nov. 21, 1988, Ser. No. 273,921
Int. Cl.[5] B44D 1/20
U.S. Cl. 427—133 22 Claims

1. A method of making a mold with a textured mold surface comprising the steps of:

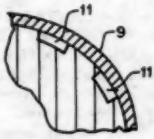
coating a mold surface of the mold with a fusible inorganic enamel composition, then applying a particulate inorganic material to the unfused enamel composition coating, and heating the enamel composition to fix the particulate material in place thereon and to harden the enamel composition, then applying a second coating of inorganic enameling composition of thickness to the coated mold surface and particulate material so that the surface of the second coating reflects the texture of the hardened enamel composition with the particulate material fixed thereon.

4,956,201

METHOD OF CREATING PASAGEWAYS IN NIOBIUM BY CVD OF NIOBIUM OVER SINTERED VANADIUM WHICH IS THEREAFTER LEACHED

Vincent Frick, Sacramento, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 29, 1988, Ser. No. 213,065
Int. Cl.[5] B05D 7/22; C23C 16/06
U.S. Cl. 427—181 15 Claims



1. Method of producing a niobium component having passageways therein comprising the steps of:

(a) providing a refractory metal niobium alloy member having slots formed within outer surface portions of said member;

(b) inserting a paste of powdered vanadium into said slots;

(c) sintering the powdered vanadium paste;

(d) depositing by chemical vapor deposition a layer of niobium over the vanadium in said slots and over the outer surface portions of said member; and

(e) removing the vanadium from said slots by leaching to produce said niobium component.

4,956,202

FIRING AND MILLING METHOD FOR PRODUCING A MANGANESE ACTIVATED ZINC SILICATE PHOSPHOR

Anthony F. Kasenga, Towanda, Pa.; A. Gary Sigai, Lexington; Thomas E. Peters, Chelmsford, and Roger B. Hunt, Medfield, all of Mass., assignors to GTE Products Corporation, Danvers and GTE Laboratories Incorporated, Waltham, both of, Mass.

Continuation-in-part of Ser. No. 288,660, Dec. 22, 1988. This application Oct. 27, 1989, Ser. No. 427,654
The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.
Int. Cl.[5] C09K 11/59
U.S. Cl. 427—215 14 Claims

1. A method for producing manganese activated zinc silicate phosphor particles wherein the individual phosphor particles are surrounded by a continuous, non-particulate, conformal aluminum oxide coating, said method comprising:

dry blending a mixture of components consisting essentially of zinc oxide, silica acid, a source of manganese, ammonium chloride, ammonium fluoride, tungstic oxide in an amount sufficient to improve phosphor maintenance in a fluorescent lamp, and silica, and having a Zn+Mn/Si mole ratio from about 1.95 to about 2.02, wherein said silica is colloidal and has a surface area of from about 50 to about 410 m^2 per gram, and wherein said colloidal silica makes up from about 0.01% to about 1.0% by weight of said mixture;

firing the resulting dry blend of components in a nitrogen atmosphere at a temperature of from about 1200° C. to about 1300° C. for a sufficient time to produce said phosphor particles;

milling the resulting phosphor particles for a period of time of from about 60 minutes to about 120 minutes;

firing the resulting milled phosphor particles in air at a temperature of from about 1175° C. to about 1275° C. for a sufficient time to diffuse the tungsten and manganese to the surfaces of the phosphor particles;

applying a continuous, non-particulate, conformal aluminum oxide coating to the outer surface of individual particles of the phosphor while said phosphor particles are suspended in a fluid bed having a midpoint temperature between 400° and 480° C., said aluminum oxide coating being formed by oxidation of trimethyl aluminum in a chemical vapor deposition reaction; and

annealing the aluminum oxide coated phosphor particles for a period of time from 4–16 hours at a temperature between 750° and 800° C.

4,956,203

ELECTRICALLY CONDUCTIVE SILICONE COMPOSITIONS

Loretta N. Kroupa, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 221,841, Jul. 20, 1988, Pat. No. 4,929,391. This application Nov. 20, 1989, Ser. No. 439,138
Int. Cl.[5] B05D 7/00
U.S. Cl. 427—221 7 Claims

1. A method of preparing an improved electrically conductive carbon particle comprising

(A) adding 100 parts by weight of inert solvent to a mixer,

(B) admixing from 6 to 30 parts by weight per 100 parts by weight of the carbon particles of (C) of conductivity improver selected from the group consisting of disilazane of the formula $(R_3Si)_2NH$ where R is a substituted or unsubstituted alkyl radical of from 1 to 6 carbon atoms, and hydroxyl endblocked polymethylphenylsiloxane having a viscosity of from 0.1 to 1.0 Pa.s at 25° C.,

(C) admixing from 3 to 40 parts by weight of conductive carbon particles, and

(D) drying and powdering the resulting hydrophobic carbon particles.

4,956,204

PROCESS OF FORMING A FILM BY LOW PRESSURE CHEMICAL VAPOR DEPOSITION

Takao Amazawa, Atsugi, and Hiroaki Nakamura, Fujisawa, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Japan

Continuation of Ser. No. 84,513, Aug. 11, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 324,983
Claims priority, application Japan, Aug. 15, 1986, 61-190494; May 15, 1987, 62-118147
Int. Cl.[5] C23C 16/00
U.S. Cl. 427—248.1 10 Claims

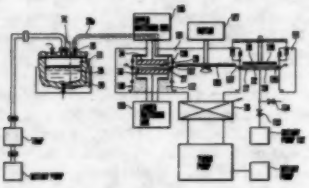
1. A chemical vapor deposition method comprising the steps of

(a) spacing apart from a first heating block, but proximate to and in a closed space, a film deposition surface of a substrate, said heating block having a heating surface;

(b) maintaining the spacing of said deposition surface equi-

distant from the opposed surface of said first heating block;

(c) maintaining a temperature of said substrate within a temperature range higher than a deposition start temperature and lower than a temperature at which a thickness distribution occurs such that a thickness of a peripheral portion of said substrate is larger than that of a central portion of said substrate;



(d) guiding a source gas into said closed space and between said substrate and said heating surface; and

(e) depositing a thin film on said film deposition surface of said substrate by a thermal reaction of the source gas heated to a temperature higher than the temperature of said substrate.

4,956,205

METHOD OF IMPROVING WATER LUBRICITY OF CERAMICS

Yuji Enomoto, and Yuko Tsunai, both of Tsukuba, Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,597

Claims priority, application Japan, May 19, 1988, 63-122850

Int. Cl.[5] B05D *3/12*

U.S. Cl. 427—299 **6 Claims**

1. A method of improving the water lubricity of silicon nitride comprising the steps of:

causing friction of said silicon nitride in the presence of water, thereby forming silanol groups on surfaces undergoing the friction;

adding to said water a water-soluble silane coupling agent having alkoxyl groups to hydrolyze said alkoxyl groups into silanol groups; and

reacting said silanol groups produced by the hydrolysis of said alkoxyl groups with said silanol groups formed on said surfaces, thereby forming a siloxane film having siloxane bonds on said surfaces.

4,956,206

RELEASE COMPOSITION

Nobuo Kaiya, and Shosaku Sasaki, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,314

Claims priority, application Japan, Feb. 18, 1988, 63-35569

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—387 **14 Claims**

1. An adhesive adhesive release composition comprising:

(A) 100 weight parts of an oxyalkylene group-containing organopolysiloxane having at least 3 silicon-bonded alkenyl groups in each molecule, as expressed by the formula $R^2(R^1R^3SiO)_x(R^1_2SiO)_ySiR^1_2R^2$, wherein R^1 is a monovalent hydrocarbon group; R^2 is selected from the group consisting of the hydroxyl group, an R^1 group, and an R^3 group; R^3 is a group having the formula $—(R^4)_a—O—(R^5O)_zR^6$ wherein R^4 and R^5 are alkylene groups having 2 to 6 carbon atoms; R^6 is the hydrogen atom or a monovalent organic group having 1 to 10 carbon atoms, a is one or zero, z has an average value of from 1 to 100; and x and y are greater than or equal to one, with the provisos that y/x has an average value of 0.1 to 100 and (x+y) has an average value of at least 10;

(B) 0.5 to 20 weight parts of an organohydrogenpolysiloxane having at least 3 silicon-bonded hydrogen atoms in each molecule; and

(C) a catalytic quantity of a platinum group metal-containing catalyst.

4,956,207

BONDING METHOD EMPLOYING SPRAYABLE HOT MELT ADHESIVES FOR CASE AND CARTON SEALING

Thomas F. Kauffman, Easton, Pa., and Paul P. Puletti, Glen Gardner, N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Nov. 14, 1988, Ser. No. 270,151

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—34.2 **14 Claims**

1. In a method for the bonding of a rigid cellulosic substrate to another rigid cellulosic substrate, the improvement which comprises utilizing as the adhesive therefore a sprayable hot melt adhesive composition comprising 25 to 50 weight percent of an isotactic thermoplastic polybutene-1/ethylene copolymer containing from about 5.5 to about 10% by weight ethylene; 20 to 60 percent of a tackifier; 15 to 30 percent of an amorphous diluent having a softening point greater than 90° C.; 0 to 2 percent antioxidant; and 0 to 10 percent wax or oil.

4,956,208

MANUFACTURE OF A QUARTZ GLASS VESSEL FOR THE GROWTH OF SINGLE CRYSTAL SEMICONDUCTOR

Akira Uchikawa; Atsushi Iwasaki, both of Takefu; Toshio Fukuoka, Sabae; Mitsuo Matsumura; Hiroshi Matsui, both of Takefu; Yasuhiko Sato, Annaka; Masaaki Aoyama, Kouriyama; Eiichi Shinomiya, Tokyo; Akira Fujinoki, Kouriyama, and Nobuyoshi Ogino, Musashino, all of Japan, assignors to Shin-Etsu Handotai Co., Ltd. and Shin-Etsu Quartz Products Co., Ltd., both of Tokyo, Japan

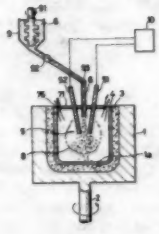
Division of Ser. No. 278,591, Dec. 1, 1988, Pat. No. 4,935,046.

This application Jul. 6, 1989, Ser. No. 376,136

Claims priority, application Japan, Dec. 3, 1987, 62-304624; Dec. 3, 1987, 62-304625; Dec. 3, 1987, 62-304626

Int. Cl.[5] B32B *17/00, 17/06*

U.S. Cl. 428—34.6 **4 Claims**



1. A quartz crucible including an opaque quartz glass outer layer containing bubbles of 20 to 250 μm in diameter in a density not smaller than 20,000 per cm^2, and a transparent quartz glass inner layer of 0.3 mm to 3.0 mm in thickness which is integrally formed with said opaque layer and having a smooth inner surface, said transparent layer having no bubbles with a diameter greater than 50 μm, and having less than 10 each per cm^2 of bubbles with a diameter between 20 and 50 μm.

4,956,209

ANTI-FOGGING MULTILAYERED FILM AND BAG PRODUCED THEREFROM FOR PACKAGING VEGETABLES AND FRUITS

Tsutomu Isaka, and Saburo Ohta, both of Inuyama, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 43,959, Apr. 29, 1987, Pat. No. 4,876,146. This application Mar. 21, 1989, Ser. No. 326,892

Claims priority, application Japan, May 1, 1986, 61-101741; Jul. 8, 1986, 61-160529; Jul. 8, 1986, 61-160530

Int. Cl.[5] B65D *30/02*

U.S. Cl. 428—35.2 6 Claims

1. A bag for packaging vegetables and fruits, comprising front and rear walls formed of a biaxially oriented multi-layer anti-fogging film, the film comprising a base layer and at least one surface layer containing an anti-fogging agent, at least three peripheral sides of the front wall being connected to corresponding peripheral sides of the rear wall in such a manner that an anit-fogging heat sealable surface layer of the front wall faces an anti-fogging heat sealable surface layer of the rear wall, the film having a water vapor transmission of 15 to 200 g/m^2 -24 hr-40° C., an oxygen permeability of 3,000 to 35,000 cc/m^2-24 hr-atm-20° C.-90% RH, and a carbon dioxide permeability of 12,000 to 130,000 cc/m^2-24 hr-atm 20° C.-90% RH, the anti-fogging surface layer having heat sealing properties such that the film shows a side welding seal strength of at least 3.0 kg-cm/15 mm when side welding is carried out at 270° C., and at least one surface of said film showing an anti-fogging property when exposed to two cycles of temperature rise and drop between 20° C. and 40° C., the temperature rises and drops occurring at 6 hour intervals.

4,956,210

FLEXIBLE FILM LAMINATES AND PACKAGING

John M. Hoyt, and Joseph Fischer, both of Cincinnati, Ohio, assignors to Quantum Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 856,084, Apr. 25, 1986, abandoned, which is a continuation-in-part of Ser. No. 426,539, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 140,510, Apr. 15, 1980, abandoned. This application Dec. 7, 1988, Ser. No. 281,115

Int. Cl.[5] B29D *22/00*; B32B *1/08*

U.S. Cl. 428—35.3 14 Claims

1. A flexible delamination-resistant structure which comprises at least an aluminum film adjacent a thermoplastic polymeric film having interposed therebetween an adhesive for said films consisting essentially of a partially hydrolyzed ethylene-vinyl acetate copolymer obtained from the hydrolysis of from about 60 to about 80 percent of the vinyl acetate groups of an ethylene-vinyl acetate copolymer containing from about 30 to about 60 percent by weight of interpolymerized vinyl acetate.

4,956,211

ELASTIC ROLLER AND A PROCESS FOR MANUFACTURING THE SAME

Shinji Saito, Shizuoka, Japan, assignor to Nitto Kogyo Co., Ltd., Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 450,189

Claims priority, application Japan, Dec. 20, 1988, 63-319575

Int. Cl.[5] B32B *3/26, 1/08*

U.S. Cl. 428—36.5 7 Claims

1. An elastic roller comprising: a roller core; and a foam silicone rubber layer wrapping around the roller core and having a skin layer fixedly coated with fine silicone resin powder.

4,956,212

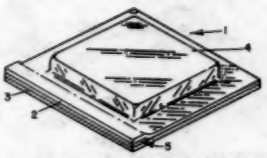
PEELABLE BARRIER FILM FOR VACUUM SKIN PACKAGES AND THE LIKE

Solomon Bekele, Taylors, S.C., assignor to W. R. Grace & Co. -Conn., Duncan, S.C.

Filed Nov. 17, 1988, Ser. No. 272,617

Int. Cl.[5] B32B *1/08*

U.S. Cl. 428—36.6 6 Claims



1. A thermoformable web for vacuum skin packages and the like which is separable into permeable and impermeable films comprising:

(a) a sealant layer comprising a polymeric material selected from the group consisting of ULDPE, and ethylene vinyl acetate copolymer having a vinyl acetate content in the range of 4% to 15% by weight, said sealant layer being one surface layer;

(b) a core layer comprising a blend of ethylene vinyl acetate copolymer and ionomer, said core layer being adjacent to said sealant layer;

(c) an optical layer comprising ULDPE, said optical layer being adjacent said core layer;

(d) a first EVOH layer adjacent to said optical layer;

(e) a first tie layer comprising a modified polymeric adhesive, said tie layer being adjacent said first EVOH layer;

(f) a second EVOH layer adjacent said first tie layer;

(g) a second tie layer comprising a modified polymeric adhesive, said second tie layer being adjacent said second EVOH layer;

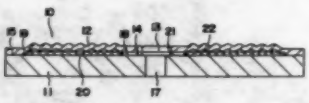
(h) a layer comprising a blend of EVA and ULDPE, said layer being adjacent said second tie layer; and

(i) a layer comprising HDPE adjacent said EVA layer, said layer being an outside layer.

4,956,213
INFORMATION RECORDING MEDIUM

Toshiyuki Masuda, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 15, 1989, Ser. No. 310,937
Claims priority, application Japan, Feb. 17, 1988, 63-34645; Feb. 22, 1988, 63-40354; Feb. 29, 1988, 63-46326
Int. Cl.[5] B32B 3/02
U.S. Cl. 428—64 9 Claims

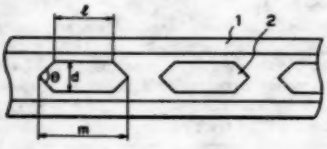


1. An information recording medium comprising a disc-shaped resin substrate having a hole at its center, an inner-side non-recording zone around the periphery of said hole and an outer-side non-recording zone inside the outer periphery of the substrate, a recording layer which is provided on the substrate between the inner-side non-recording zone and the outer-side non-recording zone, and a disc-shaped flexible resin film which is arranged on the recording layer-side surface of the substrate, said resin film having a hole at its center and protruded and depressed portions on at least the surface facing the recording layer; wherein said substrate and said flexible resin film are joined to each other both on the outer-side non-recording zone and the inner-side non-recording zone through fusion by ultrasonic welding in such manner that at least one joining of the flexible resin film to the substrate on the outer-side non-recording zone and the inner-side non-recording zone is effected through a fused portion in the form of a discontinuous ring.

4,956,214
INFORMATION RECORDING MEDIUM, PRODUCTION PROCESS AND MOLDING DIE FOR SUBSTRATE THEREFOR

Hiroyuki Imataki; Mizuho Hiraoka, both of Kawasaki; Tomoyuki Tamura, Yokohama, and Tetsuya Satoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1989, Ser. No. 301,145
Claims priority, application Japan, Jan. 25, 1988, 63-015237
Int. Cl.[5] B32B 3/02
U.S. Cl. 428—64 11 Claims

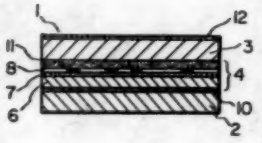


1. An information recording medium comprising a substrate having a prescribed unevenness pattern comprising a track and a plurality of information pits; said information pits having a planar shape of a polygon; and at least one diagonal of said polygon being substantially parallel to said track.

4,956,215
OPTICAL RECORDING CARD AND METHOD OF PRODUCING THE SAME

Minoru Fujita, and Yoichi Fukushima, both of Tokyo, Japan, assignors to Kyodo Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 68,543, Jun. 29, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 302,039
Claims priority, application Japan, Jul. 1, 1986, 61-154872; Jul. 1, 1986, 61-154873
Int. Cl.[5] B32B 3/02
U.S. Cl. 428—64 20 Claims



1. In an optical recording card including optical recording medium which is held between a card base and a light permeable protective layer, the improvement wherein said optical recording medium comprises a base film, an optical reflective film formed only on said base film and an optical information pattern layer having low optical reflectivity formed on said optical reflective film in direct surface contact, a locating of said reflective film between said base film and said pattern layer permitting use of a reading light beam incident upon said reflective film via said pattern layer; and wherein

said card base is made of paper, a plate of synthetic resin selected from the group consisting of PVC, PET, polycarbonate or a plate of metallic material;

said protective layer is constructed of plastic material having high light permeability selected from the group consisting of polycarbonate, acrylic resin, and epoxy resin;

said base film is selected from the group consisting of polycarbonate, polyethyleneterephthalate, polyimide, polyamide, polysulfone, polyethersulfone, polyetherketone, polyetheretherketone or polyetherimide and has a thickness in the range of 5 microns to 1mm;

said optical reflective film is constructed of a metallic material selected from the group consisting of Ni, Ti, Te, Bi, In, Pb, Sn, Sb, Zn, Se, Ga, Cd, Ag, Au, Cu, Cr, Al, or the like or their alloy material having a thickness in the range of 50 to 2000 Å or compound material comprising organic material and/or inorganic material selected from the group consisting of Te—C, Te—CS_2, Bi—CS_2, Te—telfon, Ag—gelatine or the like having a thickness in the range of 100 Å to 10 microns or multilayered film selected from the group consisting of Te—dyestuff, Te—nitrocellulose, metallic material film-dielectric material film having a thickness in the range of 100 Å to 10 microns or dyestuff film selected from the group consisting of cyanine dye, phthalocyanine dye, naphtoquinone dye having a thickness in the range of 100 Å to 10 microns or compound material comprising organic material selected from the group consisting of nitrocellulose, styrene, polyvinyl acetate (PVAc), gelatine and dyestuff or sub-oxide selected from the group consisting of TeOx, GeOx, SbOx, MoOx or layered material comprising metallic material and organic material selected from the group consisting of AuPt—(polystyrene, polymethylmethacrylate, polyvinylacetate), Al—teflon or the like or magnetic film material selected from the group consisting of MnCuBi, CdCo, TbCo, TbFe, GdTbFe, TbFeCo. having a thickness in the range of 100 Å to 5000 A; and

said optical information pattern layer is constructed of printing ink or coating material having lower light reflectivity than said optical reflective film, there being pits in said optical information pattern formed by etching or lift off.

4,956,216

OPTICAL RECORDING MEDIUM

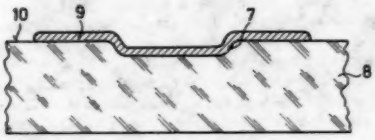
Alfons Hausler, Obertshausen; Rainer Ludwig, Karlstein-Dettingen; Michael Geibler, Wächterbach, and Michael Jung, Kahl am Main, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,766

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818934

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—64 **20 Claims**



3. An optical recording medium comprising:

a base material substrate having recording recesses on a surface thereof; and

a light-reflecting layer adhering to said surface of the substrate and covering the recesses, said layer being formed of a combination of copper and beryllium and applied by means of cathode evaporation in a vacuum.

4,956,217

SILICATE TREATED HONEYCOMB STRUCTURES

Richard R. Heitkamp, Long Beach, Calif., assignor to Ciba-Geigy Corportion, Ardsley, N.Y.

Continuation of Ser. No. 901,355, Aug. 28, 1988, abandoned. This application Dec. 22, 1988, Ser. No. 290,820

Int. Cl.[5] B32B *3/12*

U.S. Cl. 428—116 **10 Claims**

1. In a honeycomb-laminate composite structure comprising a cellular core and a facing sheet bonded to at least one face of the core, the improvement which provides flame retardant properties thereto comprising a cellular core substantially completely coated and/or impregnated with an effective fire retarding amount of a sodium silicate.

4,956,218

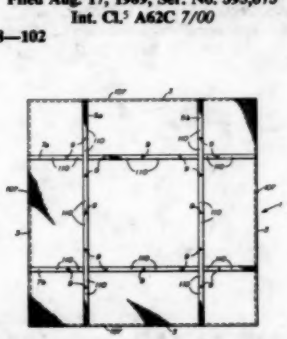
FIRE PROTECTION BLANKET

Michael L. Haining, 6731 Ashmore, Houston, Tex. 77069

Filed Aug. 17, 1989, Ser. No. 395,075

Int. Cl.[5] A62C *7/00*

U.S. Cl. 428—102 **9 Claims**



1. A fire protection structure comprising:

(a) a flexible blanket of laminar construction having first and second fire resistant layers and a third insulating layer between said first and second layers;

(b) first means for securing said layers together;

(c) first and second pluralities of straps disposed in an array on at least one surface of said blanket: and

(d) second means for securing each of said straps of said pluralities of straps to said surface.

4,956,219

METHOD OF PRODUCING PERFORATIONS IN A SOLID MATERIAL IN SHEET FORM, AN IRRADIATION DEVICE FOR WORKING THE METHOD, AND THE RESULTING PERFORATED MATERIAL

Roger Legras, Hannut, and Yves Jongen, Ohain, both of Belgium, assignors to Universite Catholique de Louvain, France

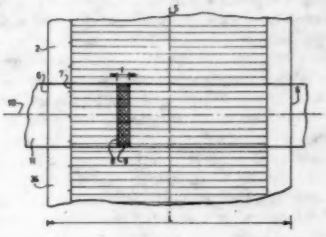
PCT No. PCT/FR87/00089, § 371 Date Jan. 25, 1988, § 102(e) Date Jan. 25, 1988, PCT Pub. No. W087/05850, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 24, 1987, Ser. No. 130,223

Claims priority, application France, Mar. 25, 1986, 86 04263

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—137 **30 Claims**



1. A material comprising perforations produced by a method in which the material is first damaged through particle beam bombardment and after which damaged areas of the material are selectively attacked, the material comprising:

a strip of thickness between a few microns and more than 100 microns; a width of between 5 cm and 150 cm; a perforation density of up to 10^{11} per cm^2; a perforation diameter of between 100 and 100,000 Angstroms.

4,956,220

MAGNETIC RECORDING MEDIUM

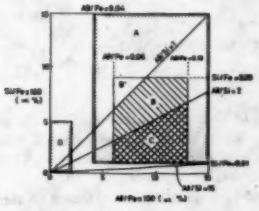
Toshinobu Sueyoshi, Kyoto; Seiichi Asada, Osaka; Masahiro Amemiya, Takatsuki; Seigi Kawarai, Ashiyashi, and Akira Miyake, Kyoto, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Mar. 20, 1987, Ser. No. 28,570

Claims priority, application Japan, Mar. 20, 1986, 61-63169; Oct. 4, 1986, 61-236664

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—141 **8 Claims**



1. A magnetic recording medium comprising a substrate and

a magnetic layer formed on said substrate, said magnetic layer including iron-containing magnetic powder dispersed in a binder, said powder comprising particles the surfaces of which are covered with both a compound containing aluminum and a compound containing silicon in such amounts that a weight ratio of silicon to iron is from 0.010:1 to 0.090:1, a weight ratio of aluminum to iron is from 0.060:1 to 0.130:1 and a weight ratio of aluminum to silicon is from 2:1 to 15:1.

4,956,221

UV CURABLE CONFORMAL COATING WITH MOISTURE SHADOW CURE

Beth I. Gutek, Freeland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 118,086, Nov. 6, 1987, Pat. No. 4,824,875. This application Dec. 8, 1988, Ser. No. 281,304

Int. Cl.[5] B32B *3/10, 27/08;* **B05D** *3/06*

U.S. Cl. 428—142 **3 Claims**

1. In a method comprising coating a substrate populated with devices having geometry such that there are areas which are in shadows when light is directed onto the substrate, exposing the coated substrate with ultraviolet radiation and thereafter allowing the exposed substrate to further cure by the reaction of moisture at room temperature, where the improvement comprises using a coating of a composition comprising

(A) at least 20 weight percent based on the total weight of the composition of an acrylamide polydimethylsiloxane having acrylamide end groups bonded to silicon atoms through Si—C bonds and on the average at least 20 to less than 300 dimethylsiloxane units per molecule,

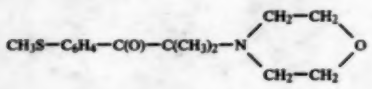
(B) at least 20 weight percent based on the total weight of the composition of a polydiorganosiloxane having endgroups containing both alkoxy groups and methacrylate groups where there are two alkoxy groups per endgroup bonded to silicon through an Si—O bond and one methacrylate group bonded to silicon through an Si—C bond and having on the average less than 350 diorganosiloxane units per molecule, said diorganosiloxane units being selected from dimethylsiloxane units, diphenylsiloxane units, and methylphenylsiloxane units wherein at least 50 percent of the organic groups of the diorganosiloxane units are methyl,

(C) at least 20 weight percent based on the total weight of the composition of a reactive diluent selected from the group consisting of isobornyl acrylate, cyclohexyl acrylate, and 2-ethylhexyl acrylate,

(D) from 0.5 to 10 weight percent based on the total weight of the composition of a photoinitiator combination in which there is at least 0.25 weight percent of based on the total weight of the composition

$$C_6H_5—C(O)C(CH_3)_2—OH$$

and at least 0.25 weight percent of based on the total weight of the composition



(E) from 0.1 to 2 weight percent based on the total weight of the composition of an amine selected from the group consisting of dimethylethanolamine and diisopropylethylamine, and

(F) from 0.05 to 1 weight percent based on the total weight of the composition of an organic titanate, where the composition has a viscosity at 25 degrees C. in the range of 0.07 to 0.2 Pa.s.

4,956,222

FORMABLE VINYL CHLORIDE RESIN COMPOSITION FOR POWDER MOLDING AND METHOD FOR PRODUCING SAME

Isao Matsuura, Takatsuki; Akira Wakatsuki, Ibaraki, and Yuu Shida, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 27, 1988, Ser. No. 290,190

Claims priority, application Japan, Dec. 26, 1987, 62-331286

Int. Cl.[5] B05D *7/00;* **C08J** *9/224*

U.S. Cl. 428—212 **4 Claims**

1. A powdery foamable vinyl chloride resin composition for powder molding containing a foaming agent wherein said composition is produced by the following dry-blending method:

a first step wherein from 40 to 120 parts by weight of plasticizer is blended with 100 parts by weight of a granular vinyl chloride resin having an average particle diameter of from 50 to 200 μm obtained by suspension polymerization or bulk polymerization to form first dry-blend particles; and after said first dry-blend particles have reached about 90° C. in the course of a temperature increase,

a second step wherein from 0.5 to 40 parts by weight of at least one polymer or copolymer having an active hydrogen in the molecule (component A) and from 0.1 to 10 parts by weight of a crosslinkable isocyanate compound (component B) are added and dry-blended to cover said first dry-blend particles with said components (A) and (B), thus forming second dry-blend particles; and while said second dry-blend particles are cooling after they have reached a maximum temperature,

a third step wherein from 3 to 25 parts by weight of a finely powdered vinyl chloride resin having an average unit particle diameter of 0.1 to 10 μm and obtained by emulsion polymerization or micro-suspension polymerization is added to cover said second dry-blend particles, said foaming agent being added in said first step.

4,956,223

RECORDING MEDIUM AND RECORDING METHOD UTILIZING THE SAME

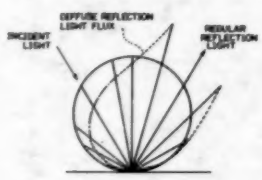
Ryuichi Arai, Sagamihara; Mamoru Sakaki, Atsugi, and Shinya Matsui, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 789,463, Oct. 21, 1985, abandoned. This application Feb. 18, 1987, Ser. No. 17,035

Claims priority, application Japan, Oct. 23, 1984, 59-223715

Int. Cl.[5] B41M *5/00*

U.S. Cl. 428—212 **7 Claims**



1. A recording medium having a directional diffuse reflection property comprising a substrate and an ink-receiving layer formed on the substrate, said directional diffuse reflection property resulting from said substrate being a film which contains a pigment causing directional diffuse reflection said pigment being selected from the group consisting of mica, pearl pigment and metal powder; said ink-receiving layer containing a pigment and resin at a ratio in the range from 0:1 to 1:10.

4,956,224

ARTICLES PRODUCED FROM A LAMINATE AND PROCESS FOR THEIR MANUFACTURE

Jean-Paul Leca, Mantes la Jolie, France, assignor to Societe Chimique Des Charbonnages S.A., Paris, France

PCT No. PCT/FR86/00373, § 371 Date Sep. 3, 1987, § 102(e) Date Sep. 3, 1987, PCT Pub. No. WO87/02622, PCT Pub. Date May 7, 1987

PCT Filed Nov. 4, 1986, Ser. No. 72,975

Claims priority, application France, Nov. 5, 1985, 85 16352

Int. Cl.⁵ B32B *7/02*

U.S. Cl. 428—213 **13 Claims**

1. A process for the manufacture of a complex shaped article comprising the steps of:

(a) hot coating a thermoplastic resin layer (A) with at least one adhesive layer (C), and

(b) subjecting the adhesive-coated layer (A) to a skeleton forming operation in a vacuum chamber using a complex-shaped layer (B) of fibre-reinforced heat-cured resin as a skelton mould, the skeleton forming conditions being such that the ratio of the thickness of layer (B) to the thickness of layer (A) in the complex-shaped article produced is at least equal to 1.5.

2. An article produced from a laminate comprising:

at least one thermoplastic resin layer (A),

at least one fibre-reinforced heat-cured resin layer (B), and

at least one adhesive layer (C) intermediate between layers (A) and (B),

the article being of complex shape and having a ratio of the thickness of layer (B) to the thickness of layer (A) at least equal to 1.5 wherein said article is produced according to the process set forth in claim 1.

4,956,225

TRANSPARENCY WITH A POLYMERIC SUBSTRATE AND TONER RECEPTIVE COATING

Shadi L. Malhotra, Mississauga, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 2, 1987, Ser. No. 33,372

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.⁵ B32B *27/06, 9/04;* **G01D** *9/00*

U.S. Cl. 428—216 **19 Claims**

1. A transparency comprised of a polymeric substrate with a toner receptive coating on one surface thereof comprised of blends selected from the group consisting of: poly(ethylene oxide) and carboxymethyl cellulose; poly(ethylene oxide), carboxymethyl cellulose and hydroxypropyl cellulose; poly-(ethylene oxide) and vinylidene fluoride/hexafluoropropylene copolymer; poly(chloroprene) and poly(α-methylstyrene); poly(caprolactone) and poly(α-methylstyrene); poly(vinyl isobutylether) and poly(α-methylstyrene); poly(caprolactone) and poly(p-isopropyl α-methylstyrene); poly(1,4-butylene adipate) and poly(α-methylstyrene); chlorinated poly(propylene) and poly(α-methylstyrene); chlorinated poly(ethylene) and poly(α-methylstyrene); and chlorinated rubber and poly-(α-methylstyrene), wherein said transparency is selected as an image receiving sheet for electrophotographic or ionographic imaging processes.

4,956,226

RUBBER-COATED GASKET

Masaaki Ashizawa; Kazuo Nishimoto, both of Kanagawa, and Hiroshi Saito, Tokyo, all of Japan, assignors to Nichias Corporation, Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,867

Claims priority, application Japan, Dec. 14, 1987, 62-315643; Jul. 26, 1988, 63-185793

Int. Cl.⁵ B32B *5/16, 15/08*

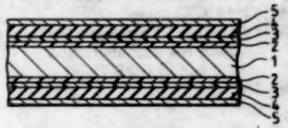
U.S. Cl. 428—323 **8 Claims**

1. A rubber-coated gasket comprising:

a metal sheet;

a rubber layer formed on at least one side of said metal sheet, said rubber layer comprising nitrile rubber containing at least one of a flaky filler and an alkyl titanate; and

a primer based on a phenolic resin bonding said rubber layer to said metal sheet.



2. A rubber-coated gasket as in claim 1, wherein said rubber layer has a thickness of 10-300 micrometers.

4,956,227

LAMINATED STRUCTURE

Naoto Hirayama, Takarazuka; Yuichi Aoki, Ibaraki; Akio Takigawa, Nishinomiya; Motoaki Yoshida, Kawanishi, and Yasunori Shiraishi, Kawasaki, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Nov. 16, 1988, Ser. No. 271,889

Int. Cl.⁵ B32B *27/36, 13/12, 27/38*

U.S. Cl. 428—331 **16 Claims**

1. A laminated structure composed of

(A) a layer comprising a polyester resin,

(B) a layer comprising a cured (meth)acrylate polymer containing an epoxy group in the molecule, which is a copolymer of

(i) 1 to 100 mole % of an ester of an aliphatic alcohol having 1 to 6 carbon atoms and an epoxy group in the molecule, and (meth)acrylic acid, and

(ii) 99 to 0 mole % of an ester of an aliphatic alcohol having no epoxy group in the molecule and having 1 to 6 carbon atoms which may optionally have a substituent, and (meth)acrylic acid, and

(C) a layer comprising a cured organopolysiloxane compound and optionally particles of an inorganic compound, wherein the organopolysiloxane compound is a hydrolyzed and condensed product of a silicon compound represented by the formula

$$(R^1-O)_n Si(R^2_m)-R^3_{4-(n+m)} \qquad (I)$$

wherein R^1 represents an alkyl or alkoxyalkyl group having 1 to 6 carbon atoms, R^2 represents an alkyl group having 1 to 6 carbon atoms, R^3 represents an alkyl group having 1 to 6 carbon atoms or a cycloalkyl group having 3 to 6 carbon atoms which may optionally be substituted by a substituent selected from the group consisting of an epoxy group, a glycidyloxy group a (meth)acryloyl group, a vinyl group, an allyl group, a mercapto group, an epoxy-substituted cycloalkyl group, a halogen atom, an amino group and an amide group, n is 2, 3 or 4, and m is 0 or 1, provided that $n+m \leq 4$; or a mixture of at least two of said hydrolyzed and condensed products,

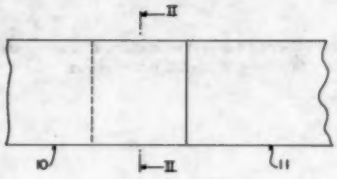
the layers (A), (B) and (C) being laminated in this sequence.

4,956,228

DISMEMBERABLE ADHESIVE JUNCTION SYSTEM

Piero R. Clerici, Milan, and Italo Casalegno, Merate, both of Italy, assignors to Ausonia S.p.A., Monza, Italy

Continuation of Ser. No. 463,833, Feb. 4, 1983, Pat. No. 4,791,024. This application Oct. 25, 1988, Ser. No. 262,319
Claims priority, application Italy, Feb. 4, 1982, 19444 A/82; Dec. 20, 1982, 24851 A/82
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.
Int. Cl.[5] B32B *15/00*
U.S. Cl. 428—336 26 Claims



1. In an adhesive fastening device in which two adhesive elements are provided for being repeatedly adhered together and releasably detached; an adhesive element comprising:

(a) a carrier forming a base of the adhesive element:

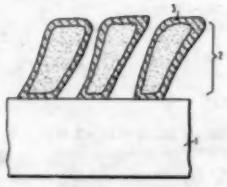
(b) an elastomeric material securely anchored to said carrier to form an adhesive layer having a face surface adherable only to a like face surface, said face surface having a relatively high adherence to said carrier and a relatively lower adherence to the like face surface of a like adhesive layer, whereby said adhesive layer releases from a like adhesive layer but not from said carrier upon detachment of the adhesive element from a like adhesive element, said detachment from a like adhesive element forming a renewed adhesive surface for subsequent readherence.

4,956,229

MAGNETIC RECORDING MEDIUM

Tadashi Yasunaga; Akio Yanai; Koji Sasazawa, and Makoto Nagao, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 30, 1988, Ser. No. 175,466
Claims priority, application Japan, Mar. 30, 1987, 62-76589
Int. Cl.[5] G11B *23/00*
U.S. Cl. 428—336 5 Claims



1. A durable, rust and scratch-resistant magnetic recording medium comprising a non-magnetic support having provided thereon a thin ferromagnetic film layer comprising iron oxide nitride, said thin ferromagnetic film being an aggregation of pillar particles of said iron oxide nitride and the content of nitrogen on the surface of each of said pillar particles being higher than that inside each of said pillar particles.

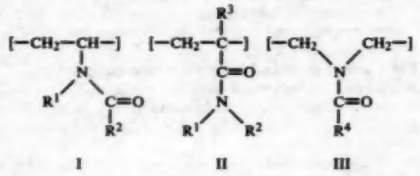
4,956,230

INK RECEPTIVE TRANSPARENCY SHEET

Donald W. Edwards; Armin J. Paff, and Daniel C. Duan, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 37,528, Apr. 13, 1987, abandoned. This application Feb. 2, 1988, Ser. No. 153,486
The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.
Int. Cl.[5] B41M *5/00*
U.S. Cl. 428—341 19 Claims

1. Transparent sheet consisting of a polymeric backing bearing on at least one major surface thereof an ink receptive layer comprising a blend of at least one hydrophobic polymer substantially free of acidic functional groups, hydroxyl groups, >NH groups, and $-NH_2$ groups and at least one hydrophilic polymer containing carbonylamido groups, said carbonylamido groups selected from the group consisting of



where

R^1 and R^2 independently represent alkyl groups, or R^1 and R^2 together can be represented by $(-CH_2-)_x$ where x is an integer from two to five, or

R^2 can be hydrogen provided that it is bonded to a carbon atom,

R^3 represents hydrogen or alkyl group having from one to six carbon atoms, and

R^4 represents hydrogen or alkyl group,

said layer capable of receiving aqueous-based inks.

4,956,231

LAMINATED SHAPED ARTICLE/SILICONE TRANSFER ADHESIVE

Jacques Cavezzan, Villeurbanne, and Jean-Louis Di Martino, Saint-Jean de Bournay, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Aug. 12, 1988, Ser. No. 231,441
Claims priority, application France, Aug. 14, 1987, 87 11697
Int. Cl.[5] C09J *7/02*; B32B *9/04, 9/06*
U.S. Cl. 428—343 10 Claims

1. A peelable, laminated shaped article comprising (i) a flexible first substrate having a crosslinked nonstick silicone layer on at least one face surface thereof, which nonstick silicone layer comprises an organopolysiloxane composition crosslinked from an organic solvent solution thereof and said organopolysiloxane composition being free from MQ resin and (a) at least one oganopolysiloxane comprising at least two SiVi groups per molecule, and (b) at least one organohydropolysiloxane comprising at least three SiH groups per molecule, with from 0.5 to 60% of the number SiVi groups in the composition being provided by a vinylated cyclotrisiloxane of the formula:

$$R(CH_2{=}CH)SiO_3 \qquad (I)$$

in which R is a C_1–C_4 alkyl radical, a phenyl radical or a 3,3,3-trifluoropropyl radical, and (ii) a precured adhesive layer adhered onto at least one nonstick silicone layer, said adhesive comprising an organopolysiloxane devoid of organic peroxide and constituting the intercondensation product of an MQ resin with a polyalkylphenylsiloxane resin.

4,956,232

MULTI-LAYER HEAT-SEALABLE POLYPROPYLENE FILMS

Ricardo Balloni, Fairport, N.Y.; Kevin M. Donovan, Milford, Conn., and Jay K. Keung, Macedon, N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,131
Int. Cl.[5] C09J 7/02; B32B 27/08
U.S. Cl. 428—349 27 Claims

1. A heat-sealable multi-layer film structure consisting essentially of

(A) an outer heat sealable layer coextensively adherent to the upper surface of core layer (B), said outer layer (A) being formed from a polymer composition (a) consisting essentially of heat sealable resin compounded with one or more slip additives which are incompatible with polypropylene,

(B) a core layer derived from a polymer composition (b) consisting essentially of an isotactic polypropylene homopolymer compounded with one or more slip additives which are incompatible with polypropylene, and

(C) an outer layer coextensively adherent to the lower surface of core layer (B), said outer layer (C) being formed from a polymer composition (c) consisting essentially of isotactic polypropylene homopolymer in the substantial absence of slip additives;

wherein the total amount of slip additive in said film structure is effective to provide the outer surface of outer layer (A) with a coefficient of friction sufficient for high speed heat sealing packaging operations but insufficient to cause substantial hazing of said structure.

4,956,233

SLIP COATED THERMOPLASTIC FILMS

Shaw-Chang Chu, West Winsor, N.J.; Paul D. Heilman, Williamson, and Kevin A. Kirk, Macedon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 292,138, Dec. 30, 1988. This application Feb. 21, 1989, Ser. No. 312,271
Int. Cl.[5] C09J 7/02
U.S. Cl. 428—349 11 Claims

1. An oriented slip-coated film structure having a coefficient of friction varying from 0.15 to about 0.3 comprising a polypropylene film comprising (1) a relatively thin surface coating on at least one side of said film said coating being comprised of (a) an aqueous wax emulsion or dispersion (b) a minor amount of talc or, a synthetic amorphous silica gel, in an amount comprising from about 0 to about 1 weight percent based on the total weight of said wax, and (2) a relatively thick base layer of a thermoplastic resin selected from polypropylene homopolymer, polypropylene coextruded with ethylene-propylene copolymer on the uncoated side in single or multi-layer forms wherein said base layer has a melt index at 230° C. ranging from about 0.1 to 25, a crystalline melting point of about 160° C., a density ranging from about 0.90 to 0.91 and a number average Mw ranging from about 25,000 to 100,000.

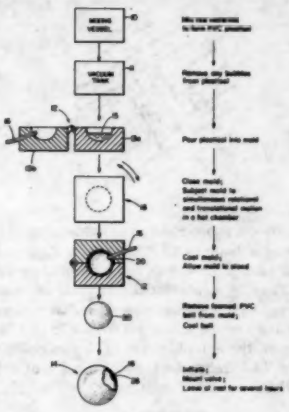
4,956,234

FOAMED PVC PNEUMATIC BALL

Jorge L. Morales, Guadalajara, Mexico, assignor to Industrias Salver, S.A. de C.V., Jalisco, Mexico

Filed Jan. 26, 1988, Ser. No. 148,529
Claims priority, application Mexico, Jan. 28, 1987, 5069
Int. Cl.[5] A63B 41/00; B29C 67/22
U.S. Cl. 428—36.5 4 Claims

1. A hollow, foamed PVC pneumatic ball, made in molds by a rotomolding process consisting of: pouring a PVC composition in the molds in an amount sufficient to obtain a finished ball with a suitable wall thickness; inserting in the molds, to provide for forming an opening intended for a valve, a PVC flexible hose; closing the molds and subjecting the same to a simultaneous rotational and translational movement within a hot chamber at a temperature of about 220° C. for about 4 minutes; cooling the molds to a temperature of about 75° C., and permitting them to stand for about 3 minutes; removing a foamed ball from the molds; inflating the foamed ball to a suitable air pressure to prevent deformation of the ball; and then permitting the ball to stand until the ball loses its elastic memory; the ball having a wall of uniform thickness with evenly distributed cells throughout the wall; the PVC composition comprising about 0.20 to 0.24% by weight of a foaming



agent; about 0.20 to 0.24% by weight of a zinc oxide; about 0.20 to 0.24% by weight of a dispersing and coloring agent; about 0.65 to 0.69% by weight of an epoxy resin; about 40.5% to 44.84% by weight of an emulsion resin; and about 50 to 57% by weight of a primary plasticizer; and the PVC composition being foamed simultaneously with the rotomolding process, the foaming being such that the ball has a soft and elastic consistency permitting inflation with the mouth using a straw inserted through a valve in the wall of the ball.

4,956,235

CARBONACEOUS FIBER OR FIBER ASSEMBLY WITH INORGANIC COATING

Francis P. McCullough, Jr.; Steven L. Brewster, both of Lake Jackson; R. Vernon Snelgrove, Damon, all of Tex., and George C. Higgins, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 163,919, Mar. 4, 1988, Pat. No. 4,902,563. This application Jun. 14, 1989, Ser. No. 366,809
Int. Cl.[5] B32B 9/00; D02G 3/00, 1/00
U.S. Cl. 428—368 10 Claims

1. An oxygen and thermally stable fiber or tow of fibers comprising a carbonaceous fiber or tow of fibers with a ceramic surface coating thereon, said carbonaceous fiber or tow of fibers comprising resilient shaped reforming elongatable non-linear non-flammable carbonaceous fiber or fibers, said fiber or fibers having a reversible deflection ratio of greater than 1.2:1 and an aspect ratio greater than 10:1.

4,956,236

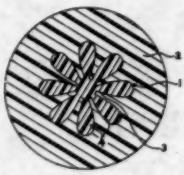
UNORIENTED MONOFILAMENT WITH MULTILOBED CORE

Teh-Chaun Wang, Parkersburg, W. Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 92,386, Sep. 2, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,221

Int. Cl.[5] D02G 3/00

U.S. Cl. 428—373 **9 Claims**



1. A coextruded, substantially unoriented, polymeric monofilament having a diameter of at least about 2.0 mm and having a sheath and a core, the sheath being in intimate contact with the core and having a substantially circular cross-section, and the core having a perimeter greater than that of the sheath, the core comprising a center and about from 4 to 14 lobes radiating from the center, the monofilament having a tensile strength of at least about 9,600 psi and a tensile modulus of at least about 85,000 at 80° C.

4,956,237

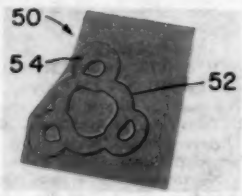
HOLLOW FIBERS HAVING CURVED MEMBERS PROJECTING THEREFOR

Harry V. Samuelson, Chadds Ford, Pa., assignor to E. I. duPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 7/192,413, May 10, 1988, Pat. No. 4,850,847. This application Jan. 24, 1989, Ser. No. 300,910

Int. Cl.[5] D02G 3/00

U.S. Cl. 428—398 **2 Claims**



1. A hollow fiber having a plurality of spacing members projecting from its outer surface in curved directions therefrom.

2. The hollow fiber of claim 1 wherein said members project from a first location on the fiber surface in a curved direction to a second location on the fiber surface thereby forming additional hollow members on the surface of said hollow fiber.

4,956,238

MANUFACTURE OF CUTTING STRUCTURES FOR ROTARY DRILL BITS

Nigel D. Griffin, Whitminster, England, assignor to Reed Tool Company Limited, Newtownabbey, Northern Ireland

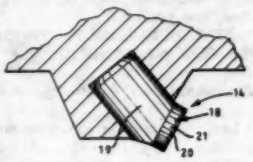
Filed Jun. 9, 1988, Ser. No. 204,688

Int. Cl.[5] B32B 9/00

U.S. Cl. 428—408 **3 Claims**

1. A cutting structure, for a rotary drill bit, comprising a preform cutting element having a front cutting face formed of superhard polycrystalline diamond material and a rear face bonded to a carbide carrier of less hard material, the cutting element being bonded to the carrier by means of an alloy having the following composition:

Ni about 30% to about 60%



Pd about 30% to about 62%

Si about 3% to about 15%

wherein % is weight percent.

4,956,239

POLY-1,2-AZEPINE, METHOD OF PRODUCING A FILM OF SUCH A POLYMER ON A SUBSTRATE AND A SUBSTRATE PROVIDED WITH SUCH A POLYMER

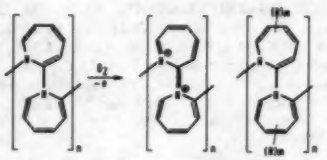
Egbert W. Meijer; Franciscus C. B. M. Van Vroonhoven, and Jozef H. H. Nijhuis, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 30, 1988, Ser. No. 175,070

Claims priority, application Netherlands, Apr. 27, 1987, 8700986

Int. Cl.[5] B05D 3/06; B32B 9/04

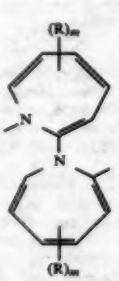
U.S. Cl. 428—411.1 **9 Claims**



1. A method of producing a polymer film or a substrate which method comprises bringing a surface of a substrate into contact with a vapor of a substituted phenylazide substituted with from 1 to 4 substituents selected from the group consisting of alkyl, alkoxy, aryl, halogen and an electron-acceptor group, exposing said thus-coated substrate to UV light thereby causing said phenylazide to polymerize to form a film, of a corresponding poly -1,2- azepine.

6. A substrate provided with a polymer which is obtained by using a method as claimed in claim 1.

7. A poly -1,2-azapine having a repeating unit of the formula



wherein R is a substituent selected from the group consisting of

alkyl, alkoxy, aryl, halogen and an electron-acceptor group and m is 1,2 or 3-.

4,956,240

USE OF POLYSILOXANES CONTAINING AMINO GROUPS AS ADDITIVES IN COATINGS FOR PLASTICS

John L. Williams; Reinhold Dederichs, both of Leverkusen; Ottfried Schlak, Cologne; Karl H. Küsler, Bergisch-Gladbach; Ulrich Grigo, Kempen, and Werner Nouvertné, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,205

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1988, 3803628

Int. Cl.[5] B32B *27/00*

U.S. Cl. 428—423.7 22 Claims

1. A process for coating a plastic substrate which comprises applying to a plastic substrate a polyurethane coating composition comprising

(i) a polyurethane dissolved in an organic solvent and

(ii) a polysiloxane containing amino groups in order to improve the levelling and wetting of said polyurethane coating composition on said plastic substrate.

4,956,241

SLIP COATED THERMOPLASTIC FILMS

Shaw-Chang Chu, West Winsor, N.J.; Paul D. Heilman, Williamson, and Kevin A. Kirk, Macedon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,138

Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—516 14 Claims

1. An oriented slip-coated film structure comprising a polypropylene film comprising (1) a relatively thin surface coating on at least one side of said film composed of a slip coating consisting of (a) an aqueous wax emulsion or dispersion (b) an aqueous polymer emulsion or solution having a glass transition temperature between about 30°–100° C. and which comprises from about 0 to 50 weight percent based on the total weight of said wax emulsion and (c) a minor amount comprising from about 0 to about 1 weight percent based on the total weight of said wax of talc or synthetic amorphous silica gel, (2) a relatively thick base layer of a thermoplastic resin selected from polypropylene homopolymer, polypropylene coextruded with ethylene-propylene copolymer on the uncoated side or other suitable polyolefin in single or multi-layer forms wherein the base layer thereof has a melt index at 230° C. ranging from about 0.1 to 25, a crystalline melting point of about 160° C., a density ranging from about 0.90 to 0.91 and a number average Mw ranging from about 25,000 to 100,000.

4,956,242

STEEL FOIL FOR DRAWING CONTAINER WITH ORGANIC FILM COAT

Keiichi Shimizu, Hikari; Junichi Tanabe, Yanai; Toshio Sugawara, Hikari; Tsuneo Inui, Tokuyama, and Yoshikazu Kondo, Kudamatsu, all of Japan, assignors to Toyo Kohan Co., Ltd., Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,007

Int. Cl.[5] C22C *38/04*

U.S. Cl. 428—606 1 Claim

1. A steel foil for drawing a container with an organic film coat which is superior in drawability comprising:

above 0.01% carbon and 0.06% and under carbon, 0.1 to 0.5% manganese, 0.01 to 0.10% aluminum and the balance of iron and inevitable impurities, and the foil having a crystal grain size which is 7.5 to 10 in grain size number (JIS G 0552) and the foil having a ratio of peak values of P(222) to P(200) in intensity of X-ray diffraction in a plane parallel to a sheet surface, i.e. a P(222)/P(200) ratio, which is larger than 0.6 and which has a yield strength of 20 to 45 kg/mm^2 and a thickness of 50 to 100 μm.

4,956,243

OPTICAL MEMORY ELEMENT

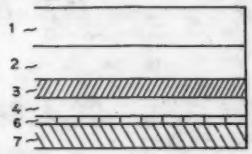
Tomoyuki Miyake, Tenri; Yoshiteru Murakami, Nishinomiya; Hiroyuki Katayama, Ikoma; Akira Takahashi, and Kenji Ohta, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1987, Ser. No. 9,211

Claims priority, application Japan, Jan. 31, 1986, 61-20449

Int. Cl.[5] G11B *7/00*

U.S. Cl. 428—694 13 Claims



1. A magneto-optical memory element comprising:

a substrate;

a magneto-optical recording medium film formed on said substrate; and

a reflector film having first and second reflector layers, wherein said first reflector layer is formed on said recording medium and comprises a material of a higher optical reflectance in a relative sense than said second reflector layer, and wherein said second reflector layer is formed on said first reflector layer and comprises a material of a smaller thermal conductivity in a relative sense than said first reflector layer, and wherein said second reflector layer comprises a material of low thermal conductivity selected from the group consisting of Ni, Th, Ta, Pb, Zr, Bi, Te, Se and AlNi alloy.

4,956,244

APPARATUS AND METHOD FOR REGENERATING ELECTROLYTE OF A REDOX FLOW BATTERY

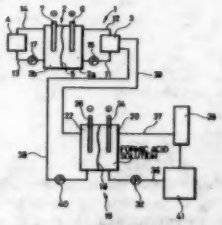
Masayuki Shimizu; Tatsuhiko Sakamoto, and Toshio Shigematsu, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd. and The Kansai Electric Power Co., Inc., both of Osaka, Japan

Filed Jun. 2, 1989, Ser. No. 360,321

Claims priority, application Japan, Jun. 3, 1988, 63-137674

Int. Cl.[5] H01M *8/06*

U.S. Cl. 429—17 14 Claims



1. A battery system comprising a redox flow battery and a regenerating cell for regenerating an electrolyte of said redox flow battery, said regenerating cell (16), comprising: a negative electrolyte chamber (22) containing a positive electrolyte of said redox flow battery (1) introduced from a positive electrolyte tank (3) of said redox flow battery (1) through an inlet pipe, said negative electrolyte chamber (22) having a negative electrode (26) immersed in said positive electrolyte, a positive

electrolyte chamber (20) connected to said negative electrolyte chamber through a membrane (18), said positive electrolyte chamber containing a formic acid solution and having a positive electrode (24) immersed in said formic acid solution, voltage applying means for applying a voltage between said positive and negative electrodes (24, 26) to emit electrons from said formic acid solution for changing a portion of metal ions contained in said positive electrolyte and having a high valence state, to metal ions having a lower valence state, and an outlet pipe for returning, to said positive electrolyte tank, said positive electrolyte containing low valence state metal ions produced by an application of a voltage by said voltage applying means to said positive and negative electrodes (24, 26).

4,956,245

FUEL CELL COOLING PLATE

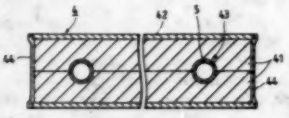
Hiroshi Shimizu; Takashi Harada; Kaoru Kondoh, and Yoshiji Kobayashi, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Jan. 24, 1989, Ser. No. 300,983

Claims priority, application Japan, Feb. 4, 1988, 63-24801; Oct. 20, 1988, 63-264320

Int. Cl.[5] H01M 8/02

U.S. Cl. 429—26 4 Claims



1. A fuel cell cooling pate operative to eliminate waste heat generated by a fuel cell by permitting a cooing medium to flow therein, comprising:

an inner substrate layer, having top and bottom external planar surfaces substantially parallel to one another, and peripheral side surfaces between said top and bottom external surfaces, said inner substrate layer consisting of two plates of a plastic or low elastic first material with opposite parallel surfaces joined together, said first material including alternating adjacent sparse and dense regions, with a plurality of substantially parallel grooves chased into the sparse regions of the material therebetween;

outer substrate layers of a second material, connectably abutting said inner substrate layer at the top and bottom external surfaces, respectively;

a plurality of cylindrical hollow pipes disposed in said grooves with full circumferential contact between said pipes and the walls of said grooves, operative to carry said cooling medium; and

sealing means for enclosing the peripheral side surfaces of said inner substrate layer and preventing permeation of reacting gas into the inner substrate.

4,956,246

ELECTROCHEMICAL STORAGE CELL

Alfred Kamuf, Walldorf, and Wolfgang Dörrscheidt, Heinstadt, both of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

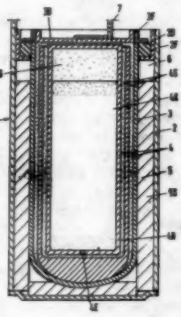
Filed Dec. 22, 1989, Ser. No. 455,305

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843906

Int. Cl.[5] H01M 10/39

U.S. Cl. 429—104 5 Claims

1. Electrochemical storage cell based on sodium and sulphur, comprising an anode space, a cathode space, an alkali metal ion-conducting solid electrolyte separating said spaces from one another, a metallic housing at least regionally bounding said spaces, a sodium-filled cartridge being disposed in said anode space and defining a sodium-filled gap between said cartridge and said solid electrolyte, and means for maintaining



a higher pressure level in said cathode space than in said anode space.

4,956,247

NONAQUEOUS ELECTROLYTE SECONDARY CELL

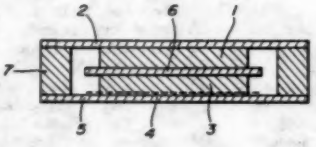
Tadaaki Miyazaki, Higashiyamato; Takao Ogino, and Takahiro Kawagoe, both of Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Mar. 29, 1989, Ser. No. 330,268

Claims priority, application Japan, Apr. 7, 1988, 63-83996

Int. Cl.[5] H01M 10/40

U.S. Cl. 429—194 7 Claims



1. A nonaqueous electrolyte secondary cell comprising:

a positive electrode of a metal oxide capable of occluding and releasing lithium ions,

a negative electrode containing at least 80 mol% of metallic lithium, and

a nonaqueous electrolyte solution containing lithium ions, wherein

the positive electrode has a capcity per unit area of up to 7 mAH/cm^2, and a thickness of 50–250 microns.

4,956,248

NON-AQUEOUS SECONDARY CELL

Nobuhiro Furukawa, Hirakata; Toshiyuki Nohma, Kadoma, and Yuji Yamamoto, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Aug. 16, 1989, Ser. No. 394,442

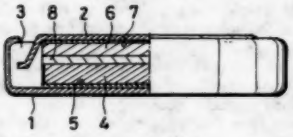
Claims priority, application Japan, Aug. 25, 1988, 63-211933; Aug. 30, 1988, 63-215870

Int. Cl.[5] H01M 10/40, 4/50

U.S. Cl. 429—194 5 Claims

1. A non-aqueous secondary cell comprising a positive electrode, a negative electrode and a separator; characterized in

that an active material of the negative electrode is one of lithium and lithium alloy and that an active material of the



positive electrode is a compound obtained by heat-treating a mixture of manganese oxide, lithium salt and metal oxide.

4,956,249

MASK STRUCTURE FOR LITHOGRAPHY

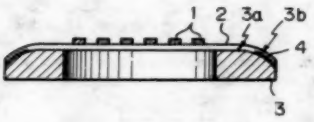
Hideo Kato; Hirohumi Shibata, both of Yokohama; Keiko Matsushita, Tokyo, and Osamu Takamatsu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 910,309, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 652,190, Sep. 19, 1984, abandoned. This application Aug. 25, 1989, Ser. No. 398,309

Claims priority, application Japan, Sep. 26, 1983, 58-177285; Sep. 26, 1983, 58-177286

Int. Cl.[5] G03F *1/00*

U.S. Cl. 430—5 **6 Claims**



1. A mask structure for lithography comprising:

(a) a base plate having a top flat end surface whose peripheral edge is non-planar so as to define a bonding surface; and

(b) a masking-material-holding film spanning the top flat end surface and bonded only to the non-planar peripheral edge that defines the bonding surface, wherein said masking-material-holding film is formed from at least one material selected from the group consisting of silicon nitride, boron nitride and silicon oxide.

4,956,250

AZULENIUM PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY

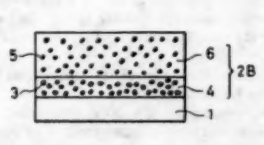
Masami Kuroda; Yoshinobu Sugata, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Mar. 21, 1989, Ser. No. 326,800

Claims priority, application Japan, Mar. 23, 1988, 63-68907; Aug. 23, 1988, 63-209116

Int. Cl.[5] G03G *5/06, 5/14*

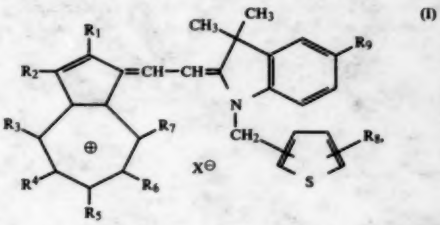
U.S. Cl. 430—58 **9 Claims**



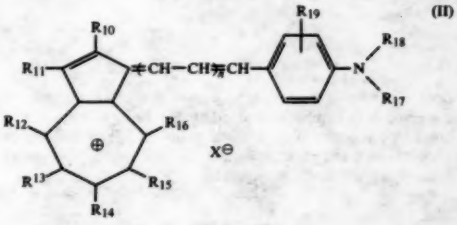
1. A photoconductor for electrophotography, comprising:

an electroconductive substrate; and

a photosensitive layer formed on said electroconductive substrate and including a charge generating substance and a charge transporting substance, said charge generating substance comprising at least one azulenium compound represented by one of general formula (I) and (II):



wherein each of R_1 and R_9 is selected from the group consisting of a hydrogen atom, a halogen atom, an alkoxy group, a substituted or unsubstituted alkyl group, and a substituted or unsubstituted aryl group, and $X^{\ominus}$ is an anion;



wherein each of R_{10} to R_{16} and R_{19} is selected from the group consisting of a hydrogen atom, a halogen atom, an alkoxy group, and an aklyl group which may have a substituent(s), each of R_{17} and R_{18} is selected from the group consisting of an alkyl group, an aryl group, an alkenyl group, and an aralkyl group, each of which groups may have a substituent(s), and at least one of R_{17} and R_{18} is a thenyl group which may have a substituent(s), n is an integer and has a value of 0 or 1, and $X^{\ominus}$ is an anion.

3. The photoconductor as claimed in claim 1, wherein said photosensitive layer comprises a laminate of a charge transporting layer, mainly composed of a charge transporting substance, and a charge generating layer including a compound selected from azulenium compounds represented by the general formula (I) or (II).

4,956,251

MULTICOLOR HEAT-SENSITIVE RECORDING MATERIAL

Shintaro Washizu; Toshimasa Usami; Sumitaka Tatsuta, and Jun Yamaguchi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 28, 1988, Ser. No. 174,306

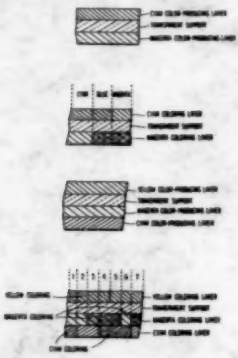
Claims priority, application Japan, Mar. 27, 1987, 62-075409

Int. Cl.[5] G03C *7/00, 1/715, 1/52*; B41M *5/34*

U.S. Cl. 430—138 **6 Claims**

1. A multicolor heat-sensitive recording material which comprises a transparent support having two or more of color-producing unit layers differing in hue of the produced color in such a situation that at least two of the unit layers of differing hue are provided on opposite sides of the support, wherein at least one color-producing layer is essentially transparent, the haze % as measured with HTR meter based on integral sphere method of each of said transparent color-producing layer is less than 40% and said transparent layer is prepared by coating a composition containing a combination of a photo-decomposable diazonium compound and a coupler or a combination of an electron donating dye precursor and a color developer as a

color former together with other additives; said combination being present in sufficient quantity within the respective layers to form a color image upon processing; at least said diazonium compound or electron donating dye precursor is enclosed in a microcapsule, on the other hand said coupler or color developer which exists in the composition with said microcapsule is dispersed in an emulsion obtained by dissolving said coupler or color developer into an organic solvent slightly soluble or insoluble in water then subjecting the resulting solution to an emulsifying dispersion treatment.



4,956,252

AQUEOUS PROCESSIBLE PHOTOSENSITIVE COMPOSITIONS CONTAINING CORE SHELL MICROGELS

Michael Fryd, Moorestown, N.J.; Ernst Leberzammer, Glen Mills, Pa., and S. Andries R. Sebastian, East Windsor, N.J., assignors to E. I. duPont de Nemours and Company, Wilmington, Del.

Filed Aug. 30, 1988, Ser. No. 238,104
Int. Cl.[5] G03C 1/68, 5/16
U.S. Cl. 430—138 **11 Claims**

1. An aqueous processible solid photosensitive composition for relief printing plates comprising

(a) an addition photopolymerizable ethylenically unsaturated monomer;

(b) a photoinitiator or photoinitiating system activated by actinic light; and

(c) a core shell microgel binder; wherein the core shell microgel binder has two domains, a core having less than 10% crosslinking and an aqueous processible non-crosslinked outer shell consisting of an acid-modified copolymer, and further wherein the monomer partitions in the shell of the microgel.

4,956,253

IMAGE-FORMING METHOD EMPLOYING IMAGE-RECEIVING MATERIAL

Taku Nakamura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

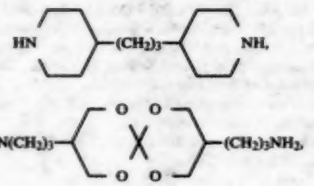
Continuation-in-part of Ser. No. 165,060, Mar. 7, 1988, Pat. No. 4,885,227. This application Aug. 24, 1989, Ser. No. 397,928
Claims priority, application Japan, Mar. 6, 1987, 62-51619
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.
Int. Cl.[5] G03C 5/54
U.S. Cl. 430—138 **10 Claims**

1. An image-forming method which comprises:

imagewise exposing to light a light-sensitive material comprising a support and a light-sensitive layer containing a photopolymerization initiator and a polymerizable compound;

pressing the light-sensitive material on an image-receiving material comprising a support and an image-receiving layer to transfer the unpolymerized polymerizable compound to the image-receiving layer of the image-receiving material,

wherein the image-receiving layer contains a hardening agent being capable of polymerizing the polymerizable compound without necessity of external energy, said hardening agent being a compound selected from the group consisting of ethylenediamine, propylenediamine, 1,3-diamino-2-hydroxypropane, 1,3-trimethylenediamine, N,N'-dimethylethylendiamine, 1,4-diaminobutane, hexamethylenediamine, diethylenetriamine, triethylenetetraamine,



polyethyleneimine, polyallylamine, poly-L-lysine, poly-L-ornithine, $NaO_2S—CH_2CH=CHCH_2SO_2Na$ and an alkali metal salt of polyvinylbenzenesulfinic acid.

10. The image-forming method as claimed in claim 1, wherein the photopolymerization initiator and polymerizable compound are contained in microcapsules which are dispersed in the light-sensitive layer.

4,956,254

IMAGE FORMING MATERIAL AND METHOD

Shintaro Washizu, and Jun Yamaguichi, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 3, 1989, Ser. No. 318,301
Claims priority, application Japan, Mar. 3, 1988, 63-50292
Int. Cl.[5] G03C 1/727
U.S. Cl. 430—138 **7 Claims**

1. An image forming material comprising a support having thereon a microcapsule-containing layer, said layer consisting essentially of at least one organic boron compound anion salt of an organic cationic dye compound represented by formula (I):

(I)

wherein $D^{\oplus}$ represents a cationic dye and R_1, R_2, R_3, and R_4 each represents a group selected from an alkyl group, an aryl group, an aralkyl group, an alkaryl group, an alkenyl group, an alkynyl group, an alicyclic group, a heterocyclic group, an allyl group, and derivatives of these groups; or two or more of said R_1, R_2, R_3 and R_4 combine together to form a cyclic structure;

at least one compound capable of cleaving at least one carbon-boron bond; and

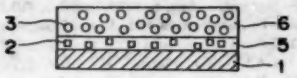
a polymer to encapsulate a core material containing said organic boron compound anion salt of an organic cationic dye compounds,

said organic boron compound anion salt being isolated from said compound capable of cleaving at least one carbon-boron bond by the walls of microcapsules, and said walls of the microcapsules being capable of increasing permeability thereof upon an increase in temperature.

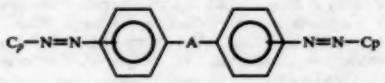
4,956,255
PHOTOSENSITIVE MEMBER

Hideaki Ueda, Azuchi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 22, 1989, Ser. No. 313,469
Claims priority, application Japan, Feb. 23, 1988, 63-40135
Int. Cl.[5] G03G 5/047, 5/06
U.S. Cl. 430—59 20 Claims



2. A photosensitive member with a photosensitive layer of function-divided type comprising a charge generating layer and a charge transporting layer on or over a electrically conductive substrate, wherein the charge generating layer comprises one or more than one of azo pigments represented by the general formula [I];



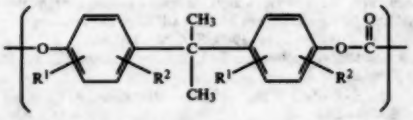
wherein A is a bivalent group selected from the group consisting of naphthalene ring, anthracene ring, fluorene ring, pyridine ring, pyridazine ring, quinozaline ring, quinoline ring, phenanthrene ring, dihydroanthracene ring, pyrazine ring and pyrene ring wherein each of said rings may have a substituent; and Cp is a residual group of a coupler.

4,956,256
PHOTOSENSITIVE MEMBER FOR ELECTROPHOTOGRAPHY

Shigenori Ohtsuka, Omiya; Hiroshi Urabe, Kawasaki; Masahiro Nukui; Mamoru Nozomi, both of Machida, and Setsuko Sasakawa, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 23,708, Mar. 9, 1987, abandoned. This application Jun. 9, 1989, Ser. No. 364,251
Claims priority, application Japan, Mar. 14, 1986, 61-56684; Dec. 12, 1986, 61-296184
Int. Cl.[5] G03G 5/05
U.S. Cl. 430—96 8 Claims

1. A photosensitive member for electrophotography comprising a photosensitive layer on a conductive substrate, said photosensitive layer containing as a binder resin a modified polycarbonate resin having the repeating structural unit represented by the following general formula (I):



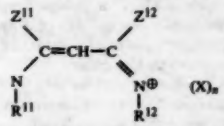
wherein R^1 and R^2 are selected from a hydrogen atom, an alkyl group having 1–3 carbon atoms and a halogen atom, at least one of R^1 and R^2 being the alkyl group or the halogen atom.

4,956,257
SILVER HALIDE PHOTOGRAPHIC MATERIAL AND METHOD FOR FORMING AN IMAGE

Nobuaki Inoue, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 1, 1988, Ser. No. 239,377
Claims priority, application Japan, Sep. 1, 1987, 62-218645
Int. Cl.[5] G03C 1/16, 1/33
U.S. Cl. 430—264 21 Claims

1. A negative silver halide photographic material comprising a support having thereon at least one chemically sensitized silver halide emulsion layer, at least one hydrophilic colloidal layer of the material containing a hydrazine derivative and a compound having substantially all absorption maxima outside the visible light region represented by formula (I):



wherein Z^{11} and Z^{12}, which may be the same or different, each represents a non-metallic atomic group necessary for completing a substituted or unsubstituted heterocyclic ring selected from benzoxazole, benzothiazole, benzoselenazole, naphthoxazole, naphthothiazole, naphthoselenazole, thiazole, thiazoline, oxazole, selenazole, selenazoline, pyridine, benzimidazole, and quinoline; R^{11} and R^{12}, which may be the same or different, each represents a substituted or unsubstituted alkyl group, provided that at least one of R^{11} and R^{12} is substituted with an acid group; X represents a counter ion required for charge balance; and n is 0 or 1.

4,956,258
DRY TONER FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH IMPROVED RESISTANCE TO TONER STAINING OF VINYL CHLORIDE PRODUCTS

Yoichiro Watanabe, Fuji; Tetsuo Isoda, and Mitsuo Aoki, both of Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,724
Claims priority, application Japan, May 13, 1987, 62-114721
Int. Cl.[5] G03G 9/08, 9/10
U.S. Cl. 430—109 3 Claims

1. A toner for developing latent electrostatic images comprising a coloring agent and a binder resin having a glass transition temperature of 50° C. to 70° C., said binder resin comprising a component selected from the group consisting of:

(a) ternary copolymers of styrene, methyl acrylate, and ethyl acrylate monomers or mixtures thereof;

(b) mixtures of a binary copolymer and a homopolymer or copolymer wherein the monomers of the binary copolymer and the monomer of the homopolymer or monomers of the copolymer are selected from the group consisting of styrene, methyl acrylate and ethyl acrylate monomers and wherein the monomer of the homopolymer or one monomer of the copolymer is different from the monomers of the binary copolymer; and

(c) mixtures of homopolymers of styrene, methyl carylate and ethyl acrylate monomers.

4,956,259

SPHERICAL ELECTROPHOTOGRAPHIC TONER PARTICLES COMPRISING CARBON AND PREPARATION THEREOF

Yoshitsugu Shirasaki, and Yoshiaki Torimoto, both of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jul. 14, 1987, Ser. No. 73,266

Claims priority, application Japan, Jul. 14, 1986, 61-165304

Int. Cl.[5] G03G 9/08

U.S. Cl. 430—137 3 Claims

1. A process for preparing a toner composition containing substantially spherical particles, said spherical particles comprising a binder resin and, dispersed in said binder resin, carbon black having a number-average particle size of 20 to 500 millimicrons and a standard deviation of particle size distribution of 70 millimicrons or smaller, which comprises the steps of

(a) dispersing carbon black, a polymerization initiator, a charge controller and one or both of a hydrophobic dispersant and a binder resin in an unsaturated polymerizable monomer to obtain an oily phase,

(b) adding said resultant oily phase into water containing a dispersion stabilizer to obtain a dispersion,

(c) agitating the dispersion at a high rate,

(d) polymerizing the dispersion; and

(e) recovering the thus obtained toner particles.

4,956,260

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT AND POLYMERIZABLE COMPOUND, AND IMAGE-FORMING METHOD EMPLOYING THE SAME

Koichi Nakamura, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 29, 1986, Ser. No. 947,312

Claims priority, application Japan, Dec. 26, 1985, 60-294337; Dec. 26, 1985, 60-294338; Dec. 26, 1985, 60-294339; Dec. 26, 1985, 60-294340

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] G03C 1/68, 1/72

U.S. Cl. 430—138 19 Claims

1. A light-sensitive material comprising a light-sensitive layer provided on a support wherein the light-sensitive layer contains silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound, and an additive compound selected from the group consisting of a 5- or 6-membered nitrogen-containing heterocyclic compound, thiourea, a thiourea derivative, a thioether compound, polyethylene glycol and a polyethylene glycol derivative, wherein the silver halide, the polymerizable compound and the additive compound are present in the microcapsules which comprise a shell and a core and which are dispersed in the light-sensitive layer, the silver halide being in the shell of the microcapsules and the polymerizable compound and the additive compound being in the core of the microcapsules, and said polymerizable compound being present in an amount of 5 to 1.2×10^5 times by weight as much as the amount of the silver halide.

4,956,261

PHOTOSENSITIVE DIAZO AND PHOTOPOLYMERIZABLE RECORDING MATERIAL WITH A PHOTOSENSITIVE DIAZO INTERMEDIATE LAYER

Georg Pawlowski, Wiesbaden, and Peter Lehmann, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 135,311, Dec. 21, 1987, abandoned.

This application Sep. 6, 1989, Ser. No. 403,007

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1986, 3644160

Int. Cl.[5] G03F 7/021, 7/027; G03C 1/76

U.S. Cl. 430—156 17 Claims

1. A photosensitive copying material for use in a printing plate comprising:

a layer base;

a photosensitive intermediate layer on the layer base consisting essentially of an admixture of a photosensitive diazonium salt polycondensation product and a polymeric binder; and

a photosensitive layer on the intermediate layer consisting essentially of an admixture of a photosensitive diazonium salt polycondensation product, a polymeric binder, a polymerization initiator which forms radicals when exposed to actinic radiation, and a polymerizable ethylenic unsaturated compound having a boiling point at atmospheric pressure of over 100° C.,

wherein the photosensitive diazonium salt polycondensation product in each said layer is present in said layer in an amount sufficient to substantially decrease the layer solubility on exposure to actinic radiation and comprises repeating A-N_2Q and B units joined by intermediate links, which are derived from carbonyl compounds which can be condensed, and A comprises the radical of an aromatic diazonium compound which can be condensed with formaldehyde, Q is the anion of said diazonium compound, and B comprises the radical of a compound which is free of diazonium groups and can be condensed with formaldehyde,

wherein said polymeric binder is present in each said layer in an amount sufficient to improve the resistance of the exposed layers against printing wear and is insoluble in water and soluble or at least swellable in organic solvents and aqueous alkaline solvents,

wherein said photoinitiator is present in an amount sufficient to initiate polymerization of said polymerizable compound on exposure to actinic radiation, and

wherein said polymerizable compound is present in an amount sufficient to form a polymerized product which decreases the solubility of said layers in combination with said photosensitive diazonium salt polycondensation product on exposure to actinic radiation.

4,956,262

PHOTOSENSITIVE PRINTING PLATE FOR WATERLESS OFFSET PRINTING WITH PHOTOSENSITIVE LAYER OF DIAZONIUM SALT POLYCONDENSATION PRODUCT AND PHOTOPOLYMERIZABLE COMPOSITION AND OVERLYING SILICONE RUBBER LAYER

Hans-Joachim Schlosser, and Joachim Gersdorf, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,343

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1987, 3738863

Int. Cl.[5] G03F 7/021, 7/028, 7/032; G03C 1/76

U.S. Cl. 430—162 16 Claims

1. A photosensitive printing plate for waterless offset printing comprising:

(a) a support;

(b) a photosensitive layer comprising in admixture:

(i) a photosensitive diazonium salt polycondensation product comprising first recurring units and second recurring units that are linked by bivalent intermediate members derived from a carbonyl compound which is capable of condensation, said first recurring units being derived from aromatic diazonium salts which are capable of condensing with formaldehyde, and said second recurring units being derived from diazonium group-free compounds which are capable of condensing with formaldehyde, in an amount sufficient to substantially decrease the layer solubility on exposure to actinic radiation;

(ii) a free-radical polymerizable acrylate or methacrylate of a polyhydric alcohol in an amount sufficient to form a polymerized product which decreases the solubility of said layer in combination with said photosensitive diazonium salt polycondensation product on exposure to actinic radiation;

(iii) a polymerization initiator that forms free radicals under the action of actinic radiation in an amount sufficient to initiate polymerization of said polymerizable compound on exposure to said radiation; and

(iv) a polymeric binder in an amount sufficient to improve the resistance of the exposed layer against printing wear; and

(c) an overlying, printing-ink repellant silicone rubber layer.

4,956,263

SILVER HALIDE PHOTOGRAPHIC MATERIAL CONTAINING A COMPOUND CAPABLE OF RELEASING A DYE

Kunio Ishigaki; Kazunobu Katoh; Nobuaki Inoue; Hisashi Okada; Toshinao Ukai; Morio Yagihara; Yoshihiro Takagi, and Masakazu Yoneyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 31, 1988, Ser. No. 238,796

Claims priority, application Japan, Sep. 1, 1987, 62-218648; Sep. 4, 1987, 62-221283; Sep. 4, 1987, 62-221285; Dec. 18, 1987, 62-320701; Jan. 18, 1988, 63-7856

Int. Cl.[5] G03C *1/10*

U.S. Cl. 430—264 **18 Claims**

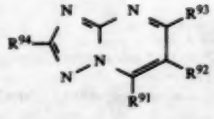
1. A silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer, and containing in the silver halide emulsion layer or another hydrophilic colloid layer (i) a compound represented by formula (I)

$$PWR\text{-}(\text{-Time}\text{-})_t\text{-}LA \qquad (I)$$

wherein PWR represents a group capable of releasing

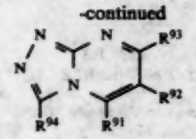
$$\text{-}(\text{-Time}\text{-})_t\text{-}LA$$

upon being reduced; Time represents a group capable of releasing LA after being released from PWR, t is 0 or 1; and LA represents a group having an absorption maximum in the wavelength region longer than 310 nm, (ii) a hydrazine derivative, and (iii) at least one compound represented by formulae (IX) and (X)



(IX)

-continued



(X)

wherein R^{91}, R^{92}, R^{93}, and R^{94}, which may be the same or different, each represents hydrogen, an alkyl group, an aryl group, an amino group, a hydroxyl group, an alkoxy group, an alkylthio group, a carbamoyl group, a halogen atom, a cyano group, a carboxyl group, an alkoxycarbonyl group or a heterocyclic group and R^{91} and R^{92} or R^{92} and R^{93} may be linked to form a 5- or 6-membered ring; provided that at least one of R^{91} and R^{93} represents a hydroxyl group.

4,956,264

RADIATION-POLYMERIZABLE MIXTURE

Ulrich Geissler, Hochheim/Main; Hartmut Steppan, Wiesbaden, and Walter Herwig, Bad Soden Am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 820,782

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540480

Int. Cl.[5] G03C *1/16*

U.S. Cl. 430—281 **18 Claims**

1. A radiation-polymerizable mixture, consisting essentially of:

(a) an amount of a polymeric binder selected from the group consisting of (i) a polymeric binder that is water-insoluble and soluble or at least swellable in aqueous-alkaline solutions, (ii) a polyacrylate and (iii) a polymethacrylate, said amount ranging from 25% to 75% by weight, based on the total weight of non-volatile constituents;

(b) from 25% to 75% by weight, based on the total weight of non-volatile constituents, of polymerizable material, comprising

(1) up to 95% by weight, based on the weight of polymerizable material, of a compound that is polymerizable by free radicals, that has a boiling point above 100° C. at atmospheric pressure, and that contains at least two ethylenically unsaturated polymerizable groups and

(2) from 5% to 100% by weight, based on the weight of polymerizable material, of an acrylic or alkacrylic acid derivative that is polymerizable by free radicals and that has a boiling point above about 100° C. at atmospheric pressure,

wherein the weight-percentages in (a) and (b) are based, respectively, on the total weight of non-volatile constituents, and

(c) from 0.01 to 10% by weight, based on the total weight of non-volatile constituents, of at least one initiator compound capable of initiating the polymerization of said acid derivative under the action of actinic radiation, wherein said acid derivative is represented by the formula:

wherein

A is O, NH, or N-alkyl,

Q is —CO—C_pH_{2p}—Z— or —C_kH_{2k}O—,

Z is O or NH,

R^1 is H or alkyl,

R^2 is alkyl, alkenyl, cycloalkyl, aryl, aralkyl or SOT_2R^3,

R^3 is alkyl, alkenyl, cycloalkyl, aryl aralkyl or aryloxy,

k is a number from 3 to 20,

l is a number from 0 to 20,

m is a number from 2 to 20

n is a number from 1 to 20, and

p is a number from 2 to 10.

4,956,265

RADIATION CROSSLINKABLE COMPOSITIONS

Thomas P. Klun; Aida F. Robbins, and M. Zaki Ali, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

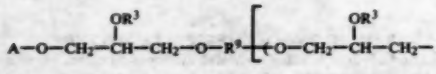
Division of Ser. No. 151,879, Feb. 3, 1988, Pat. No. 4,914,165. This application Jan. 22, 1990, Ser. No. 467,900

Int. Cl.[5] **G03C** *1/73;* **G03F** *7/032;* **C08F** *283/00;* **C08L** *75/06*

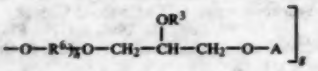
U.S. Cl. 430—283 **16 Claims**

1. A photopolymerizable composition comprising

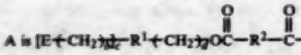
1) a compound having a formula selected from the group consisting of Formulae I, III, IV, and v, wherein Formula I is:



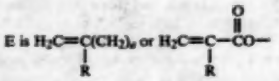
I



wherein



in which



in which

R is hydrogen, halogen, or methyl, and

a is an integer of 1 to 6;

R^1 is a polyvalent aliphatic group having 1 to 15 carbon atoms and a valence of c+1, and optionally containing one or two catenary oxygen or

groups,

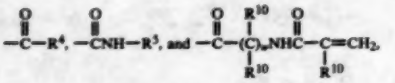
b is zero or an integer of 1 to 6,

c is an integer of 2 to 5,

d is zero or an integer of 1 to 6; and

R^2 is a divalent linear or branched saturated or unsaturated aliphatic group having 2 to 10 carbon atoms or a divalent arylene group having 6 to 10 carbon atoms;

R^3 is selected from the group consisting of hydrogen,



in which each R^{10} is hydrogen or lower alkyl of 1 to 4 carbon atoms, and each R^4 and R^5 is independently an organic group selected from alkyl groups having 1 to 10 carbon atoms, ethylenically unsaturated groups having 2 to 10 carbon atoms, cycloalkyl groups having 5 to 7 ring carbon atoms and a total of 5 to 10 carbon atoms, and aryl groups having 6 to 10 carbon atoms, with the provision that 5 to 100 mole percent of all R^3 groups are

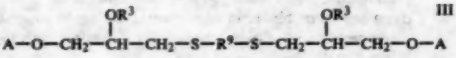
in which R^4 is substituted by

and w is 1 or 2;

R^6 is a divalent organic group;

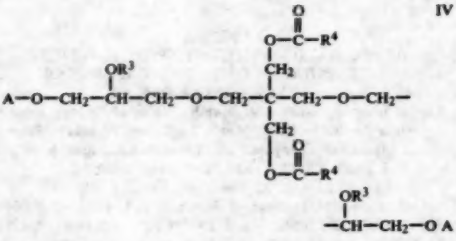
R^9 is R^6 or a polyvalent organic group having a valence of g+1, in which g is an integer having a value of 1 to 10, that is aliphatic, cycloaliphatic, or aromatic and having a weight average molecular weight of in the range of 28 to 1000, and

h is zero or a number having an average value of up to 20, with the proviso that when R^9 is not R^6, then h is zero; Formula III is:



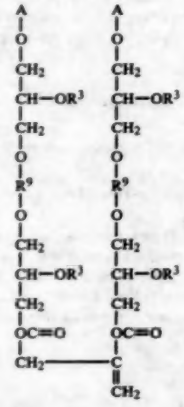
III

wherein A, R^3, and R^9 are as previously defined; Formula IV is:



IV

wherein A, R^3, and R^4 are as previously defined; and Formula V is:



V

wherein A, R^3, and R^9 are as previously defined,

2) a binder resin, and

3) a radiation sensitive system capable of initiating free radical polymerization.

4,956,266

AROMATIC OLIGOMERS

Michael E. B. Jones, Chester, and John G. Carey, Appleton, both of England, assignors to Imperial Chemical Industries plc, London, England

Division of Ser. No. 733,920, May 14, 1985, Pat. No. 4,743,663. This application Feb. 5, 1988, Ser. No. 152,873

Claims priority, application United Kingdom, May 14, 1984, 8412264; Jan. 28, 1985, 8502040

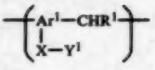
Int. Cl.[5] G03C 5/16, 5/00

U.S. Cl. 430—325 17 Claims

1. A process for the preparation of a photoresist which process comprises the steps of

(i) preparing a layer which comprises a composition comprising a photoinitiator system and an oligomer, which is linear or branched, which oligomer

(a) comprises on average at least one in-chain residue of the general formula



and;

(b) has one or more pendant and/or terminal acyloxymethyl groups, wherein the acyloxy group is derived from a polymerizable olefinically unsaturated carboxylic acid;

wherein Ar^1 is an aromatic group or a substituted aromatic group;

R^1 is hydrogen or a hydrocarbyl group;

X is a group which activates Ar^1 to electrophilic attack; and

Y^1 is an organic residue bearing a carboxyl substituent;

(ii) exposing the layer imagewise to suitable electromagnetic radiation; and

(iii) treating the layer with a dilute solution of base to remove the unexposed regions of the layer.

4,956,267

METHOD FOR FORMING A DIRECT POSITIVE COLOR IMAGE

Shinji Ueda; Tatsuo Heki; Noriyuki Inoue; Takatoshi Ishikawa; Nobutaka Ohki; Morio Yagihara; Kiyoshi Morimoto; Hiroshi Fujimoto, and Kazuto Andoh, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 172,818, Mar. 25, 1988, abandoned. This application May 31, 1988, Ser. No. 200,268

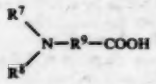
Claims priority, application Japan, Mar. 25, 1987, 62-71041; Mar. 26, 1987, 62-72573; Mar. 26, 1987, 62-72574

Int. Cl.[5] G03C 7/46

U.S. Cl. 430—372 10 Claims

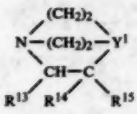
1. A method for forming a direct positive color image comprising image-wise exposing to light a light-sensitive material having at least one internal latent image type silver halide emulsion layer which is unfogged and at least one color image-forming coupler on a support; either (1) subjecting the resulting material to fogging exposure to light and/or processing it with a nucleating agent before development, and then developing the resulting material with a surface developing solution containing an aromatic primary amine type color developing agent, or (2) developing the material after the image-wise exposure with a surface developing solution containing an aromatic primary amine type color developing agent under fogging exposure and/or in the presence of a nucleating agent; and bleach-fixing the resulting material, wherein the color developing solution contains at least one compound selected from the group consisting of compounds represented by the following general formulae (III), (IV-a) and (IV-b) or a dimer or a polymer which are obtained by dimerizing or polymerizing the compound of the formulae (III), (IV-a) or (IV-b):

General formula (III)



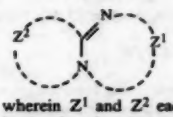
wherein R^7 and R^8 each represent a hydrogen atom, or a substituted or unsubstituted alkyl group, R_9 represents a substituted or unsubstituted alkylene group, and sum of carbon number of R^7, R^8 and R^9 is 3 or more;

General formula (IV-a)



wherein Y^1 represents —N or —CH, and R^{13}, R^{14} and R^{15} each represent a hydrogen atom, a lower alkyl group, a hydroxy-substituted lower alkyl group, a hydroxyl group or an alkoxy group, and R^{14} and R^{15} may combine to form a carbonyl group; and

General formula (IV-b)



wherein Z^1 and Z^2 each represents a methylene chain having 2 to 8 carbon atoms necessary for forming a heterocycle, and Z^1 and Z^2 may each have one or more substituents thereon.

4,956,268

BLEACH-FIXING SOLUTION CONCENTRATE COMPOSITION AND METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Kiyoshi Nakazyo; Takatoshi Ishikawa, and Yoshikazu Fujita, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 26, 1989, Ser. No. 343,323

Claims priority, application Japan, Apr. 28, 1988, 63-105683

Int. Cl.[5] G03C 7/00, 7/02, 5/38

U.S. Cl. 430—393 14 Claims

1. A two-part bleach-fixing solution composition for a silver halide color photographic material comprising a first concentrate composition containing a reducing compound comprising a silver halide solvent and a preservative as main components; and a second concentrate composition having a pH of 1.5 or less, containing an oxidizing compound comprising a bleaching agent and an acid as main components.

4,956,269

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Hideo Ikeda, and Shigeru Ohno, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 27, 1989, Ser. No. 441,592

Claims priority, application Japan, Nov. 24, 1988, 63-296778

Int. Cl.[5] G03C 1/46

U.S. Cl. 430—505 10 Claims

1. A silver halide color photographic material comprising a support having thereon at least one red-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer and at least one blue-sensitive silver halide emulsion layer, wherein each of the green-sensitive silver halide emulsion layer, the red-sensitive silver halide emulsion layer and the

blue-sensitive silver halide emulsion layer contains at least one color image forming coupler, and wherein 50% or more of the total projected area of the silver halide grains in at least one of the emulsion layers comprises tabular silver halide grains having a thickness of less than 0.5 μm, a diameter of 0.6 μm or more and an average aspect ratio of 3 or more, and the red-sensitive emulsion layer and/or the green-sensitive emulsion layer contains a dye in an amount sufficient to reduce the sensitivity thereof by 20% or more based on the sensitivity of the red-sensitive emulsion layer and/or the green-sensitive emulsion layer containing no dye, the dry film thickness from the photosensitive emulsion layer that is farthest from the support to the photosensitive emulsion layer that is nearest the support is 16.0 μm or less and the swelling ratio of the silver halide color photographic material, excluding the support and any hydrophilic layers coated on the support on the opposite side of the photosensitive silver halide emulsion layers, is 1.25 or more.

4,956,270

SILVER HALIDE PHOTOGRAPHIC MATERIAL HAVING IMPROVED ANTISTATIC AND ANTIBLOCKING PROPERTIES

Noriki Tachibana; Eiichi Ueda; Nobuaki Kagawa, and Hideo Ota, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 46,163, May 5, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 318,417

Claims priority, application Japan, May 6, 1986, 61-103534; May 7, 1986, 61-104371

Int. Cl.[5] G03C 1/94

U.S. Cl. 430—527 **13 Claims**

1. A silver halide photographic element comprising: a support; a silver halide emulsion layer on said support; and at least one hydrophilic colloidal layer hardened with a hardening agent on said silver halide emulsion layer,

wherein said hardening agent is present in an amount ranging from 0.0005 to 0.05 equivalents per 100 g of hydrophilic colloid, has a number average molecular weight of at least 3,000 and contains at least two hardening groups in the same molecule, said hardening groups selected from the group consisting of aldehyde, epoxy, active halide, active vinyl and active ester groups,

said colloidal layer comprising at least one of (i) an organic fluoro-compound present in an amount ranging from 0.1 to 2,000 mg/m^2 of the photographic element and (ii) a nonionic surfactant having at least one polyoxyethylene unit, said nonionic surfactant being present in an amount ranging from 1.0 to 1,000 mg/m^2 of the photographic element, and the ratio of organic fluoro-compound to nonionic surfactant, when used in combination, ranging from 0.001 to 1.0,

and wherein said hardening agent, said organic fluoro-compound and said nonionic surfactant are each different from each other.

4,956,271

MATERIAL TREATMENT

Philip G. Milone, Burlington, Mass., assignor to Wolverine Corporation, Merrimac, Mass.

Filed Jul. 5, 1989, Ser. No. 375,814

Int. Cl.[5] F27B 9/28

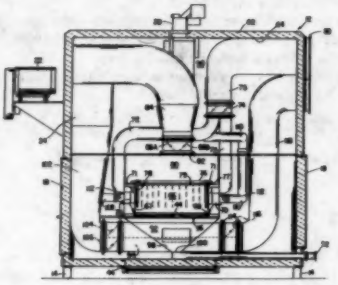
U.S. Cl. 432—59 **25 Claims**

15. A multimode system for thermal treatment of particulate material comprising structure defining a series of particle treatment zones,

perforate conveyor structure for supporting the particulate material to be thermally treated disposed for movement through said series of treatment zones,

each said housing structure further including structure defining a first distribution plenum disposed above said treatment zone and an array of nozzle tubes extending downwardly from said first distribution plenum into said treatment zone to flow conditioned gas thro ugh said nozzle tubes with substantial velocity into said treatment zone for thermal treatment of particulate material being transported by said conveyor structure through said treatment zone, and structure defining a second distribution plenum disposed below said treatment zone for pressurizing the region below said treatment zone and flowing conditioned gas upward through said conveyor structure for treating particulate material on said conveyor,

conditioning gas circuit structure connected to said first and second distribution plenum structures,



control structures in said conditioning gas circuit structure for controlling distribution of gas through said first and second distribution plenum structures and discharge therefrom into said treatment zone to selectively provide different modes of particulate product treatment in said series of treatment zones,

and

air blast structure and vacuum structure coupled to said second distribution plenum for removing debris from said conveyor and from said second distribution plenum.

4,956,272

ORGANOGERMANIUM CONTAINING SOLUTION FOR WASHING AND STORING SEPARATED ORGANS

Norihiro Kakimoto, Machida; Kazuo Kumano, Yamato, and Kunie Nakamura, Sagamihara, all of Japan, assignors to Asai Germanium Research Institute Co., Ltd., Tokyo, Japan

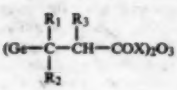
Filed Oct. 24, 1988, Ser. No. 261,628

Claims priority, application Japan, Oct. 29, 1987, 62-273745

Int. Cl.[5] A01N 1/02

U.S. Cl. 435—1 **16 Claims**

1. A solution for washing and storing separated organs, said solution comprising a hypertonic electrolyte solution and an effective washing and storing amount of an organogermanium compound represented by the formula (I):



(I)

wherein R_1 to R_3 are each a hydrogen atom, a lower alkyl group which may be the same or different, or a substituted or unsubstituted phenyl group, and X is a hydroxyl group, an O-lower alkyl group, an amino group or O^-Y^+ wherein Y is a metal or a basic group-containing compound.

4,956,273

SYNTHETIC PEPTIDES AND METHOD OF USE FOR DIAGNOSIS AND VACCINATION FOR AIDS AND ARC

Ronald C. Kennedy, San Antonio; Gordon R. Dreesman, Helotes, both of Tex., and Myron Essex, N. Easton, Mass., assignors to Southwest Foundation For Biomedical Research, San Antonio, Tex. and President and Fellows of Harvard College, Cambridge, Mass.

Continuation of Ser. No. 203,609, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 790,830, Oct. 24, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 331,052

Int. Cl.[5] G01N *33/569*; A61K *39/12*; C07K *7/08, 7/10*

U.S. Cl. 435—5 8 Claims

1. A synthetic peptide having the following amino acid sequence: asn-a-thr-leu-b-gln-ile-c-d-lys-leu-arg-glu-gln-phe-gly-asn-asn-lys; where a is asn or ala; b is lys or glu; c is asp, val or ala; and d is ser or lys.

8. A method for the detection of antibodies against the viral causative agents of AIDS comprising contacting a synthetic peptide as claimed in any one of claims 1–5 with a sample suspected of containing said antibodies and using the binding affinity of the synthetic peptide to detect said antibodies.

4,956,274

REAGENT STABILIZATION IN ENZYME-DONOR AND ACCEPTOR ASSAY

Pyare L. Khanna, Fremont; Robert Dworschack, Antioch, and Phillip Ruprecht, Albany, all of Calif., assignors to Microgenics Corporation, Concord, Calif.

Filed Apr. 6, 1987, Ser. No. 34,757

Int. Cl.[5] G01N *33/53*; C12N *9/96*

U.S. Cl. 435—7 10 Claims

1. In a specific binding assay for an analyte utilizing enzyme complementation, wherein a detectable signal is generated upon the reassociation of beta-galactosidase peptide fragments in a reaction mixture to form active enzymes wherein the improvement comprises:

(a) storing a beta-galactosidase peptide fragment in a storage medium containing an ionic surfactant or a surfactant derived from a sugar residue in an amount sufficient to stabilize said beta-galactosidase peptide fragment against storage loss of complementation activity; and

(b) adding a cyclodextrin to said storage medium in an amount sufficient to clathrate said ionic surfactant or said surfactant derived from a sugar residue after said storing but prior to using said fragments in said specific binding assay.

4,956,275

MIGRATORY DETECTION IMMUNOASSAY

Robert F. Zuk, Burlingame; Richard D. Armenta, Sunnyvale, and Jonathan Briggs, Los Altos Hills, all of Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.

Filed Apr. 14, 1987, Ser. No. 38,294

Int. Cl.[5] G01N *33/535, 33/558, 33/543*; C12M *1/40*

U.S. Cl. 435—7 30 Claims

1. A method for determining the presence of an analyte in a sample suspected of containing said analyte, said method employing a strip device capable of providing capillary transport and comprising at least four regions: in the direction of eluent migration (1) a reagent region displaced from a first end of said strip device, containing a reagent consisting of a labeled specific binding member diffusibly bound to said strip, (2) a first detection region comprising a bound complementary specific binding member of said labeled specific binding member, said complementary specific binding member being capable of specifically binding (3) a sample region for receiving said sample; and (4) a second detection region comprising the bound complementary specific binding member of said labeled specific binding member wherein said second detection region may extend from said reagent region into any reservoir region; with the proviso that said sample region and said second detection region may overlap, said method employing a signal producing system capable of producing a detectable signal at said second detection region and comprising said labeled specific binding member; said method comprising

adding said sample to said sample region;

immersing said first end in an eluent to provide a moving liquid phase through said strip, whereby said eluent migrates through said strip carrying said labeled specific binding member and, when sample is outside said detection region, carrying sample into said detection region, and distributing said labeled specific binding member within at least one measurement site in said second detection region in relation to the amount of analyte in said sample, wherein there are at least two spatially separated measurement sites; and

determining the amount of bound labeled specific binding member by means of said signal producing system at said measurement sites as compared to a sample having a known amount of analyte, where the relationship between the amounts at the different sites is compared to the relationship obtained with a sample having a known amount of analyte.

4,956,276

ANALYTICAL METHOD OF DETERMINING A REDUCED CO-ENZYME

Iqbal Siddiqi, Geneva, Switzerland, and Jean Brochot, Saint Julien en Genevois, France, assignors to Battelle Memorial Institute, Geneva, Switzerland

PCT No. PCT/CH86/00032, § 371 Date Nov. 13, 1986, § 102(e) Date Nov. 13, 1986, PCT Pub. No. WO86/05517, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 10, 1986, Ser. No. 939,123

Claims priority, application Switzerland, Mar. 15, 1985, 1165/85

Int. Cl.[5] C12Q *1/58, 1/54, 1/32, 1/28*

U.S. Cl. 435—12 10 Claims

1. An analytical method of determining a nicotinamide co-enzyme selected from the group consisting of NADH, NADPH and APADH wherein the co-enzyme is reacted in a reaction medium with a fluorinated-ring aromatic compound

selected from the group consisting of 2-, 3- and 4-fluorophenol, tetrafluorophenol, pentafluorophenol and 4-fluoro-aniline in the presence of oxygen and a substance having peroxidase activity, this reaction resulting in the formation of fluoride ions which are determined, the rate at which the ions are formed being quantitatively linked to the original quantity of co-enzyme to be determined.

4,956,277

PHOTOCONDUCTOR COMPRISING CHARGE TRANSPORTING HYDRAZONE COMPOUNDS

Masami Kuroda; Youichi Nakamura, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Dec. 7, 1988, Ser. No. 281,029

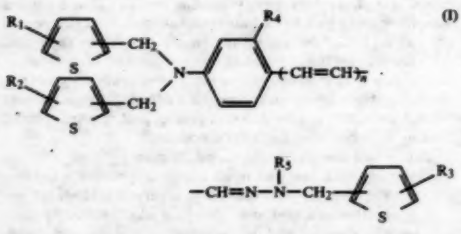
Claims priority, application Japan, Dec. 9, 1987, 62-311310; Dec. 16, 1987, 62-317770; Dec. 22, 1987, 62-326230; Dec. 22, 1987, 62-326228; Dec. 28, 1987, 62-332364; Dec. 28, 1987, 62-332370; Dec. 28, 1987, 62-332371

Int. Cl.[5] G03G *5/10*

U.S. Cl. 430—58 21 Claims

1. An electrophotographically photosensitive material, comprising:

a photosensitive layer containing a charge transporting substance comprising at least one hydrogen compound represented by general formula (I):



(I)

wherein each of R_1, and R_2, R_3 and R_4 is selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, an allyl group, a nitro group, an aryl group, and an amino group, both of which aryl group and amino group may have a substituent(s); R_5 is an aryl group which may have a substituents(s); and n is an integer and has a value of 0 or 1.

4,956,278

ANAPLASMA MARGINALE ANTIGEN, ANTIGEN COMPOSITIONS, VACCINE AND PROCESS FOR THE PRODUCTION OF SAID ANTIGEN, ANTIGEN COMPOSITIONS AND VACCINE

Lewis T. Hart; Donald G. Luther, and William J. Todd, all of Baton Rouge, La., assignors to Louisiana State University, Baton Rouge, La.

Filed Feb. 23, 1988, Ser. No. 159,394

Int. Cl.[5] C12Q *1/24;* C12P *21/00;* C12N *1/00;* C07K *3/12*

U.S. Cl. 435—30 10 Claims

1. A process for obtaining from *Anaplasma marginale* infected erythrocytes, and leukocytes, *Anaplasma marginale* sufficiently pure for use in a vaccine which, on injection, is effective in protecting the vaccinate against anaplasmosis and does not induce neonatal isoerythrolysis in offspring of the vaccinate which comprises

selectively lysing the erythrocytes of the *Anaplasma marginale* infected erythrocytes with a lysing agent, without lysing the leukocytes,

concentrating the *Anaplasma marginale* and lysed erythrocytes, while separating leukocytes therefrom,

subjecting the concentrate of *Anaplasma marginale* and erythrocytes, from which the leukocytes have been separated, to fractionation under pressure to release therefrom *Anaplasma marginale* initial bodies,

concentrating the *Anaplasma marginale* initial bodies by centrifugation over a density cushion so that the *Anaplasma marginale* initial bodies become concentrated in a band adjacent said density cushion,

harvesting the *Anaplasma marginale* initial bodies, and

washing the *Anaplasma marginale* initial bodies to obtain substantially pure *Anaplasma marginale.*

4,956,279

BIOTRANSFORMATION OF L-TYROSINE AND L-PHENYLALANINE TO 2,5-DIHYDROXYPHENYLACETIC ACID

Ramunas Bigelis, Elkhart, and Kathleen A. Black, Bristol, both of Ind., assignors to Miles Inc., Elkhart, Ind.

Continuation of Ser. No. 172,770, Mar. 28, 1988, Pat. No. 4,877,728. This application Jul. 19, 1989, Ser. No. 390,966

Int. Cl.[5] C12R *1/645, 1/73;* C12P *21/00, 39/00*

U.S. Cl. 435—42 5 Claims

1. A biologically pure culture of *Yarrowia lipolytica* having the identifying characteristics of ATCC 20875 together with derivatives and mutants of said strain said culture being further characterized in that it is unable to grow on L-tyrosine and/or L-phenylalanine as the sole carbon source and when grown in a growth medium containing L-tyrosine, L-phenylalanine or a mixture thereof which medium contains a sub-optimal concentration of carbohydrate assimilable by the fungus, it produces recoverable quantities of homogentisic acid.

4,956,280

BIPHASIC SHUTTLE VECTORS

Jeffrey S. Buzby, Los Angeles, Calif.; Ronald D. Porter, and S. Edward Stevens, Jr., both of State College, Pa., assignors to Research Corporation, New York, N.Y.

Filed Nov. 6, 1986, Ser. No. 927,772

Int. Cl.[5] C12P *21/00, 19/34, 1/04;* C12N *15/00;* C07H *15/12*

U.S. Cl. 435—69.1 9 Claims

1. In a method for recombinant gene expression in *E. coli* and *A. quadruplicatum,* wherein a vector is employed to control gene expression the improvement which comprises employing as said vector a biphasic shuttle vector capable of replication and expression of a heterologous gene in *E. coli* and *A. quadruplicatum,* said vector comprising an *E. coli* replication origin and an *A. quadruplicatum* replication origin, at least two selectable markers and an *A. quadruplicatum* c-phycocyanin apoprotein promoter operably linked to said heterologous gene.

4,956,281

DNA SEQUENCES, RECOMBINANT DNA MOLECULES AND PROCESSES FOR PRODUCING LYMPHOCYTE FUNCTION ASSOCIATED ANTIGEN-3

Barbara P. Wallner, Cambridge; Timothy A. Springer, Newton; Catherine Hession, South Weymouth; Richard Tizard, Cambridge; Robert Mattaliano, Newton, and Michael L. Dustin, Boston, all of Mass., assignors to Biogen, Inc., Cambridge and Dana Farber Cancer Institute, Inc., Boston, both of, Mass.

Filed Jun. 3, 1987, Ser. No. 57,615

Int. Cl.[5] C12P *21/00;* C12N *15/00, 1/20*

U.S. Cl. 435—69.3 10 Claims

1. A DNA sequence selected from the group consisting of:

(a) the DNA sequence which codes for the LFA-3 polypeptide carried in phage λHT16;

(b) DNA sequences which hybridize under conditions equivalent to about 20° to 27° C. below Tm and 1 M sodium chloride to the LFA-3 DNA sequence of (a) and which code on expression for a polypeptide that binds to CD2, the receptor on the surface of T-lymphocytes; and

(c) DNA sequences which code on expression for a polypeptide that binds to CD2 which is coded for on expression by any of the foregoing DNA sequences.

4,956,282

MAMMALIAN PEPTIDE EXPRESSION IN PLANT CELLS

Robert M. Goodman; Vic C. Knauf, both of Davis; Catherine M. Houck, Vacaville, and Luca Comai, Davis, all of Calif., assignors to Calgene, Inc., Davis, Calif.

Filed Jul. 29, 1985, Ser. No. 760,236

Int. Cl.[5] C12P *21/04*; C12N *15/00*; C07H *15/12*

U.S. Cl. 435—69.51 **3 Claims**

1. A method for producing an interferon, which method comprises:

growing dicotyledonous plant cells containing an integrated sequence comprising a first expression cassette having in the direction of transcription

(1) a transcriptional and translational initiation region functional in said dicotyledonous plant cells and derived from a region which regulates expression of a T-DNA gene,

(2) a structural gene coding for an interferon, and

(3) a termination region functional in said dicotyledonous plant cells; and further comprising

a second expression cassette having in the direction of transcription

(1) a transcriptional and translational initiation region functional in said dicotyledonous plant cells,

(2) a structural gene coding for an enzyme which imparts antibiotic resistance, and

(3) a T-DNA boundary; whereby said structural gene is expressed to produce said interferon; and

isolating said interferon substantially free of plant cell components.

4,956,283

PROCESS FOR PREPARING MACROLIDE ANTIBIOTICS BY CULTURING STREPTOMYCES HIRSUTUS ATCC 53513

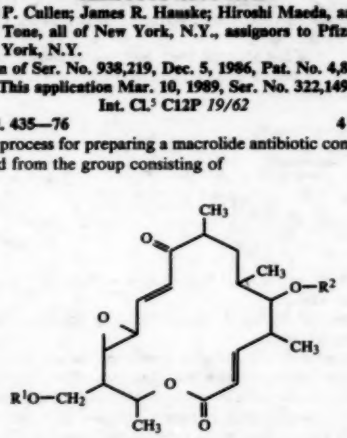
Walter P. Cullen; James R. Hauske; Hiroshi Maeda, and Junsuke Tone, all of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 938,219, Dec. 5, 1986, Pat. No. 4,835,141. This application Mar. 10, 1989, Ser. No. 322,149

Int. Cl.[5] C12P *19/62*

U.S. Cl. 435—76 **4 Claims**

1. A process for preparing a macrolide antibiotic compound selected from the group consisting of



and

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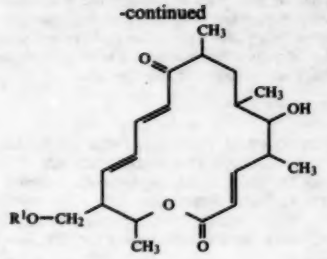
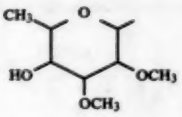
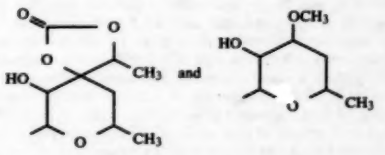


wherein R^1 is the radical of the formula



and R^2 is a radical selected from the group consisting of



which comprises cultivating the microorganism *Streptomyces hirsutus* ATCC 53513 or a mutant thereof having the ability to produce a macrolide antibiotic compound selected from said group, in an aqueous culture medium containing assimilable sources of carbon, nitrogen and inorganic salts, under submerged, aerobic conditions, until a recoverable amount of a macrolide antibiotic compound selected from said group is obtained.

4,956,284

PROCESS FOR PRODUCING 4-(2-METHOXYETHYL)-PHENYL-GLYCIDYL ETHER AND/OR METOPROLOL

Gareth T. Phillips; Brian W. Robertson, both of Kent, Great Britain; Mauro A. Bertola, Delft, Netherlands; Hein S. Koger, Spaarhdan, Netherlands; Arthur F. Marx, Delft, Netherlands, and Peter D. Watts, Kent, Great Britain, assignors to Gist-Brocades N.V., Delft, Netherlands

Continuation-in-part of Ser. No. 735,079, May 16, 1985, abandoned. This application Feb. 6, 1986, Ser. No. 826,791

Claims priority, application Netherlands, Feb. 13, 1985, 8503666

Int. Cl.[5] C12P *17/02*, *13/00*; C12N *1/12*; C12R *1/365*

U.S. Cl. 435—123 **13 Claims**

1. A process for the preparation of metoprolol in a stereospecific form or a non-toxic, pharmaceutically acceptable acid addition salt thereof and/or a sterospecific form of 4-(2-methoxyethyl)-phenyl glycidyl ether which comprises subjecting 4-(2-methoxyethyl)-phenyl allyl ether to the action of a microorganism selected from the group consisting of *Nocardia corallina* (ATCC 31338); *Rhodococcus sp* (NCIB 11277); *Mycobacteriaum rhodochrous* (NCIB 9703); *Rhodococcus equi* (NCIB 12035); *Pseudomonas aeruginosa* (NCIB 12036); *Pseudomonas oleovorans* (ATCC 29347); *Pseudomonas putida* (NCIB 9571) and *Pseudomonas Aeruginosa* (NCIB 8704) having the ability for sterio-selective epoxidation of 4-(2-methoxyethyl)-phenyl allyl ether into 4-(2-methoxyethyl)-phenyl glycidyl

ether having at least 80% by weight the S configuration, at least partly separating 4-(2-methoxyethyl)-phenyl glycidyl ether with isopropylamine and at least partly separating metroprolol and/or converting metoprolol into the non-toxic, pharmaceutically acceptable acid addition salts.

4,956,285

PROCESS FOR THE PREPARATION OF S-2,2-R_1,R_2-1,3-DIOXOLANE-4-METHANOLS

Marie-José De Smet, Zeist, Netherlands, assignor to Gist-Brocades N.V., Delft, Netherlands

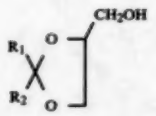
Filed Aug. 18, 1989, Ser. No. 396,927

Claims priority, application European Pat. Off., Jun. 29, 1989, 89201733.6

Int. Cl.[5] C12P *17/04, 1/04;* C07P *41/00*

U.S. Cl. 435—126 12 Claims

1. A process for the preparation of an enriched S-isomer of a 2,2-R_1,R_2-1,3-dioxolane-4-methanol of the formula



I

wherein R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 6 carbon atoms or taken together with the carbon atom to which they are attached form a carbocyclic ring of 3 to 6 carbon atoms comprising subjecting a mixture of R and S isomers of formula I to the action of a microorganism or an enzyme derived therefrom capable of stereoselective consumption of the R form of formula I for a period of time sufficient to consume the R-isomer to obtain an enriched S isomer of the compound of formula I.

4,956,286

PROCESS FOR THE PREPARATION OF ESTERS

Alasdair R. Macrae, Bedford, Great Britain, assignor to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Dec. 21, 1987, Ser. No. 135,355

Claims priority, application European Pat. Off., Dec. 19, 1986, 86202336.3

Int. Cl.[5] C12N *9/20;* C12P *7/64*

U.S. Cl. 435—134 11 Claims

1. In a process for preparing an ester from an alcohol and fatty acid or glyceride thereof by enzyme-catalyzed conversion, the improvement which comprises mixing the fatty acid or glyceride thereof with a lipase catalyst and adding the alcohol to said mixture at such a rate that the alcohol concentration in the reaction mixture is kept below a molar ratio of 0.5 moles of alcohol per mole of fatty acid/acyl group whereby the rate of ester formation is increased.

4,956,287

PROCESS FOR PRODUCING OLEAGINOUS COMPOSITION

Kazuaki Suzuki; Shoji Maruzeni; Eiji Nakai, and Toru Neru, all of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1987, Ser. No. 132,213

Claims priority, application Japan, Dec. 23, 1986, 61-307358; Nov. 9, 1987, 62-282646

Int. Cl.[5] C12N *9/20;* C12P *7/64;* C07H *13/02, 1/00*

U.S. Cl. 435—134 11 Claims

1. A process for producing a high nutritive value oleaginous composition for confectionary fat or hard butter and combining high solid fat content and high meltability in the mouth which comprises transesterifying a fat containing polybasic unsaturated fatty acid(s) as constituting fatty acid(s) and a saturated fatty acid(s), a saturated fatty acid alcohol ester(s) or mixture thereof, with a lipase having a site-specificity thereby to give an oleaginous composition comprising at least 40% of symmetric triglyercide(s) each having a polybasic unsaturated fatty acid group at the 2-position and at least 50% of completely saturated fatty acid(s) each having 16 or more carbon atoms.

4,956,288

METHOD FOR PRODUCING CELLS CONTAINING STABLY INTEGRATED FOREIGN DNA AT A HIGH COPY NUMBER, THE CELLS PRODUCED BY THIS METHOD, AND THE USE OF THESE CELLS TO PRODUCE THE POLYPEPTIDES CODED FOR BY THE FOREIGN DNA

James G. Barsoum, Quincy, Mass., assignor to Biogen, Inc., Cambridge, Mass.

Filed Apr. 22, 1988, Ser. No. 185,212

Int. Cl.[5] C12N *15/00, 1/20;* C12P *21/00*

U.S. Cl. 435—172.3 20 Claims

1. A method for preparing recombinant host cells containing foreign DNA at a copy number of 50 or greater, said method comprising the following steps:

(a) subjecting a population of cells to electroporation in the presence of said foreign DNA, wherein said foreign DNA comprises:

(i) at least one protective gene coding for a protein capable of protecting said recombinant host cells against a toxic substance, wherein increasingly higher copy numbers of said protective gene are required for, and capable of, protecting said recombinant host cell against increasing concentrations of said toxic substance,

(ii) at least one product gene coding for a polypeptide whose production is desired,

said genes being operably linked to regulatory sequences that are compatible with said recombinant host cells;

(b) culturing the cells produced in step (a) for a time sufficient to allow these cells to recover from the electroporation process;

(c) exposing the cells produced in step (b) to a sufficient concentration of said toxic substance to kill or severely retard the division of those cells with a copy number of less than 50.

4,956,289

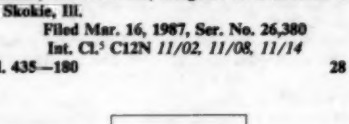
THIN FILM MEMBRANE ENZYME REACTOR AND METHOD OF USING SAME

Wolfgang J. Wrasidlo, LaJolla, and Frieder K. Hofmann, Oceanside, both of Calif., assignors to Brunswick Corporation, Skokie, Ill.

Filed Mar. 16, 1987, Ser. No. 26,380

Int. Cl.[5] C12N *11/02, 11/08, 11/14*

U.S. Cl. 435—180 28 Claims



1. An enzyme reactor consisting essentially of:

a support;

an enzyme hydrogel layer physically entrapped on said support; and

a porous thin film diffusion membrane on said enzyme hydrogel layer, wherein said thin film diffusion membrane has a thickness of from about 0.0012 to 0.2 microns and a pore size sufficient to permit diffusion of a substrate for said enzyme and of the product of a reaction of said substrate catalyzed by said enzyme, but which will not permit said enzyme to pass through said thin film diffusion mem-

brane, said thin film diffusion membrane adapted to direct exposure of a process stream.

4,956,290

LARGE SCALE PROCESS FOR THE PURIFICATION OF ALCOHOL OXIDASE

Roger G. Harrison, Jr., Norman, and Lynn P. Nelles, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 27, 1989, Ser. No. 331,220

Int. Cl.[5] C12N *9/04, 9/02;* C12R *1/84;* C12Q *1/26*

U.S. Cl. 435—189 19 Claims

1. A process for the purification of alcohol oxidase from whole cells of *Pichia pastoris* grown on methanol comprising the steps of:

(a) forming an aqueous suspension of from about 0.8 to about 6 volume percent of an autolytic treating agent, and a quantity of said whole cells of *Pichia pastoris* containing alcohol oxidase, wherein said cells are present in an amount in the range of from about 85 to about 150 grams per liter of said aqueous suspension, in a manner whereby said whole cells release at least a portion of said alcohol oxidase thereby forming aqueous liquor;

(b) filtering said aqueous liquor by crossflow filtration to separate at least a portion of said alcohol oxidase from said aqueous liquor thereby forming an alcohol oxidase solution;

(c) ultrafiltering and desalting said alcohol oxidase solution to form an alcohol oxidase suspension; and

(d) recrystallizing alcohol oxidase from said alcohol oxidase suspension.

4,956,291

METHOD FOR PRODUCTION OF CELLULOLYTIC ENZYMES AND METHOD FOR SACCHARIFICATION OF CELLULOSIC MATERIALS THEREWITH

Takashi Yamanobe; Yasushi Mitsuishi, both of Ibaraki, and Yoshiyuki Takasaki, Chiba, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

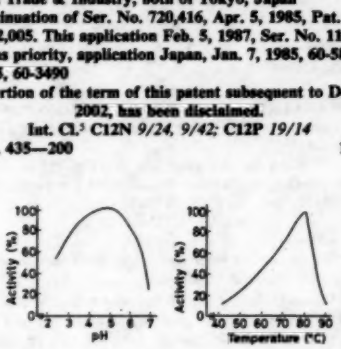
Continuation of Ser. No. 720,416, Apr. 5, 1985, Pat. No. 4,742,005. This application Feb. 5, 1987, Ser. No. 11,043

Claims priority, application Japan, Jan. 7, 1985, 60-581; Jan. 11, 1985, 60-3490

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[5] C12N *9/24, 9/42;* C12P *19/14*

U.S. Cl. 435—200 1 Claim



1. A method for production of a cellulose/xylanase enzyme composite, which comprises: culturing *Acremonium cellulolyticus* BP-495 in a culture medium containing carbon and nitrogen sources and collecting said enzyme composite from the resultant culture broth.

4,956,292

VIRAL STRAIN ISOLATED FROM CEREBROSPINAL FLUID OF AN HIV SEROPOSITIVE MAN HAVING ACUTE AND REGRESSIVE ENCEPHALOPATHY AND USE OF THE STRAIN IN AN IMMUNOASSAY

Jean-Claude Chermann, Elancourt; Blandine Rouquette; Francoise Rey, both of Paris, and Francoise Barre-Sinoussi, Issy Les Moulineaux, all of France, assignors to Institut Pasteur, Paris, France

Filed Oct. 29, 1987, Ser. No. 114,021

Int. Cl.[5] C12N *7/00, 15/00*

U.S. Cl. 435—235 1 Claim

1. A substantially pure preparation of a retrovirus strain deposited under culture collection accession number CNCM I-170.

4,956,293

NOCARDIA SP. ATCC 53492, OR AN ANTIBIOTIC A 42867 PRODUCING MUTANT OR VARIANT THEREOF

Ernesto Riva; Maurizio Denaro, both of Milan; Enrico Selva, Gropello Cairoli; Giovanni Cassani, Pavia, and Francesco Parenti, Lainate, all of Italy, assignors to Gruppo Lepetit S.p.A., Italy

Continuation of Ser. No. 78,501, Jul. 28, 1987, Pat. No. 4,804,534. This application Nov. 14, 1988, Ser. No. 270,884

Claims priority, application United Kingdom, Jul. 29, 1986, 8618445

Int. Cl.[5] C12N *1/20;* C12R *1/365*

U.S. Cl. 435—253.2 2 Claims

1. A biologically pure culture of Nocardia sp. ATCC 53492 or an antibiotic A 42867 producing mutant or varient thereof, said culture being capable of producing antibiotic A 42867 in a recoverable amount in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances.

4,956,294

CULTURE OF *STREPTOVERTICILLIUM SYNROENSE* FOR PRODUCING AN ANTIBACTERIAL

Sara A. Currie, Roselle; Thomas W. Miller, Cartoret; Eugene L. Dulaney, Summit; James P. Springer, Mountainside; Mary E. Valiant, Plainfield; Sheldon B. Zimmerman, Springfield, all of N.J., and Sagrario M. Del Val, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 164,707, Mar. 7, 1988, abandoned. This application May 9, 1989, Ser. No. 349,181

Int. Cl.[5] C12N *1/20;* C12R *1/625;* C12P *1/04, 17/16*

U.S. Cl. 435—252.1 3 Claims

1. A biologically pure culture capable of producing antibiotic L-654,040 in a recoverable amount in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances, having all of the identifying characteristics of the MA6011 strain of *Streptoverticillium synroense* ATCC 53699 or any antibiotic L-654,040 producing mutant thereof.

4,956,295

STABILIZATION OF DRIED BACTERIA EXTENDED IN PARTICULATE CARRIERS

A. Louis Sudoma, Milwaukee, Wis., assignor to Chr. Hansen's Laboratory, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 612,324, May 21, 1984, abandoned. This application Apr. 27, 1987, Ser. No. 43,105

Int. Cl.[5] C12N *1/20, 1/04;* C12R *1/23, 1/25*

U.S. Cl. 435—252.1 15 Claims

1. The method of forming a stabilized mixture of dried viable bacteria extended in a particulate carrier, comprising:

(a) preparing a blend by intermixing a major proportion of a carrier comprising particulate inorganic salt administrable to animals with a minor proportion of a silica gel adsorbent, said carrier salt being selected to have a water adsorbing capacity of less than one percent (1%) of its mois-

ture free weight when equilibrated in air of 50% relative humidity and being blended in at least 3 parts by weight per each part of said adsorbent, said silica gel adsorbent having a water adsorbing capacity of at least 20% of its moisture free weight when equilibrated in air at 50% relative humidity, said blend containing about 1 to 5% by weight of said adsorbent;

(b) dispersing in said blend either during the intermixing of step (a) or subsequent thereto dried viable bacterial to form a highly diluted storable admixture thereof and

(c) packaging said admixture in packaging material having a low vapor transmission rate.

4,956,296

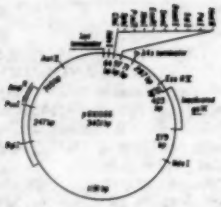
CLONED STREPTOCOCCAL GENES ENCODING PROTEIN G AND THEIR USE TO CONSTRUCT RECOMBINANT MICROORGANISMS TO PRODUCE PROTEIN G

Stephen R. Fahnestock, Olney, Md., assignor to Genex Corporation, Gaithersburg, Md.

Continuation-in-part of Ser. No. 63,959, Jun. 19, 1987, which is a continuation-in-part of Ser. No. 329, Feb. 17, 1987, which is a continuation-in-part of Ser. No. 854,887, Apr. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 829,354, Feb. 14, 1986, abandoned. This application Jun. 20, 1988, Ser. No. 209,236

Int. Cl.[5] C12N *1/20, 15/00*; C07H *15/12*

U.S. Cl. 435—252.33 **13 Claims**



1. A gene which encodes a Protein G variant, wherein said gene comprises the following DNA sequence:

10	20	30
ATGGATCCTG	CATTACCTAA	GACTGACACT
AAAGGCGAAA	CAACTACTGA	AGCTGTTGAT
TACGCTAACG	ACAACGGTGT	TGACGGTGAA
ACAGTTACTG	AAAAACCAGA	AGTGATCGAT
TACAAACTTG	TTATTAATGG	TAAAACATTG
40	50	60
TACAAATTAA	TCCTTAATGG	TAAAACATTG
GCTGCTACTG	CAGAAAAAGT	CTTCAAACAA
TGGACTTACG	ACGATGCGAC	TAAGACCTTT
GCGTCTGAAT	TAACACCAGC	CGTGACAACT
AAAGGCGAAA	CAACTACTAA	AGCAGTAGAC
310	320	330
GCAGAAACTG	CAGAAAAAGC	CTTCAAACAA
TGGACTTATG	ATGATGCGAC	TAAGACCTTT
GTCGCTTCAA	AACGTAAAGA	AGACTAA
340	350	360
TACGCTAACG	ACAACGGTGT	TGATGGTGTT
ACGGTAACTG	AAATGGTTAC	AGAGGTTCCG

or a degenerate variant thereof.

4,956,297

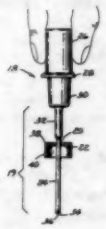
DEVICE FOR OBTAINING PREDETERMINED AMOUNTS OF BACTERIA

John K. Hood, St. Paul; Marlys E. Lund, Eden Prairie, and Robert L. Nelson, Bloomington, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 13, 1989, Ser. No. 310,324

Int. Cl.[5] C12M *1/26*

U.S. Cl. 435—292 **8 Claims**



1. A wand assembly for picking up a predetermined quantity of bacteria from at least one growth colony of the bacteria, said assembly comprising:

an elongate rod having an axis, opposite upper and lower ends, an upper portion adjacent said upper end adapted for manual engagement, an elongate tip portion adjacent said lower end, said tip portion having a peripheral surface and a generally uniform cross sectional shape along said axis, said tip portion having a groove opening through said lower end with said groove having a size adapted to ingest the predetermined quantity of bacteria by capillary action;

a collar around said rod, said collar comprising a wiping portion adapted to move axially in close proximity along said peripheral surface of said tip portion to wipe unwanted bacteria from said peripheral surface; and

means for releasably attaching said collar to said rod at a predetermined axial distance from said lower end with said wiping portion adjacent said peripheral surface.

4,956,298

SEPARATION OR REACTION COLUMN UNIT

Stephan Dickmann, Wagenstieg 5, D-3400 Goettingen, Fed. Rep. of Germany

Filed Jan. 13, 1989, Ser. No. 296,737

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1988, 8800301; Dec. 23, 1988, 3843610

Int. Cl.[5] C12M *1/12*

U.S. Cl. 430—311 **25 Claims**

1. A column unit for insertion in a centrifuge to separate or react a sample material, comprising:

a first vessel including a feed opening at a first end of said first vessel, a discharge opening at a second end of said first vessel, a hollow cylinder between said first and second ends and column material located within a middle portion of said hollow cylinder, wherein a sample material may flow through said feed opening, said column material, and said discharge opening;

a second vessel configured to fittingly receiving a portion of said first vessel comprising said discharge opening and said middle portion of said hollow cylinder, wherein the

sample material may flow through said discharge opening into said second vessel;

a feed cap which seals said feed opening of said first vessel; and

a means for attaching a syringe to said feed cap.

4,956,299

COMPLEMENT STABILIZATION

Uri Piran, Sharon; Milos Stastny, Ashland, and Laura S. Uretsky, Milford, all of Mass., assignors to Ciba Corning Diagnostics Corp., Medfield, Mass.

Filed Dec. 31, 1986, Ser. No. 316
Int. Cl.[5] G01N 33/54
U.S. Cl. 436—18 16 Claims

1. A stabilized aqueous complement solution comprising complement, water, and a buffering compound selected from the group consisting of morpholino buffering compounds, tris-hydroxymethyl buffering compounds, and a combination of morpholino and tris-hydroxymethyl buffering compounds, wherein the final concentration of the buffering compound in the stabilized aqueous complement solution is greater than about 0.01M and the final pH of the stabilized aqueous complement solution is between about 6.5 and about 8.5.

4,956,300

AID FOR DETERMINING THE PRESENCE OF OCCULT BLOOD, METHOD OF MAKING THE AID, AND METHOD OF USING THE AID

Henry J. Wells, Beaumont, Tex., assignor to Helena Laboratories Corporation, Beamount, Tex.

Continuation of Ser. No. 337,143, Jan. 5, 1982, abandoned. This application Oct. 16, 1984, Ser. No. 661,273
Int. Cl.[5] G01N 21/78, 33/72
U.S. Cl. 436—66 13 Claims

1. An essentially dry, one-step diagnostic aid for determining the presence of hemoglobin in fecal matter in an aqueous environment comprising:

a dry adsorbent carrier having guaiac adsorbed thereon said carrier selected from the group consisting of adsorbed silica-based materials, calcium phosphate, and mixtures thereof, the carrier holding said guaiac readily available to react in the presence of hemoglobin and an oxidizing agent in an aqueous environment to yield to blue dye; and

a dry oxidizing agent consisting essentially of a monopersulfate compound capable of oxidizing said guaiac to a blue dye in the presence of water and hemoglobin, said oxidizing agent in the absence of water being substantially nonreactive with said guaiac adsorbed onto said carrier; and

a binder into which the carrier and oxidizing agent have been compressed to form a tablet.

4,956,301

TEST DEVICE AND METHOD OF ASSAYING FOR FRUCTOSAMINES

Ibrahim A. Ismail, South Bend, and David W. Michaels, Elkhart, both of Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Nov. 2, 1989, Ser. No. 430,328
Int. Cl.[5] G01N 33/00, 33/48, 33/49
U.S. Cl. 436—87 39 Claims

1. A composition capable of exhibiting a sufficient color transition upon contacting a fructosamine-containing liquid test sample to indicate the presence or concentration of fructosamine in the test sample comprising:

(a) a chromogenic indicator dye capable of being reduced by a fructosamine;

(b) a buffer to maintain the pH of the composition at a value of at least about 11; and

(c) a reaction accelerator compound to enable the reaction between the fructosamine and the chromogenic indicator dye to proceed at ambient temperature.

4,956,302

LATERAL FLOW CHROMATOGRAPHIC BINDING ASSAY DEVICE

Julian Gordon, Lake Bluff, Ill., and Charles S. G. Pugh, Kenosha, Wis., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 95,801, Sep. 11, 1987, abandoned. This application May 15, 1989, Ser. No. 355,043
Int. Cl.[5] G01N 33/58
U.S. Cl. 436—161 11 Claims

1. A test device for determining the presence or amount of an analyte substance in a sample by means of one or more specific binding reactions comprising:

a chromatographic medium which extends throughout said device, defining a flowpath having capillarity and the capacity for chromatographic solvent transport of one or more reactive sample components and non-immobilized reagents; said chromatographic medium comprising (1) a prefiltering zone; (2) a reaction site disposed downstream from said prefiltering zone at which is present an immobilized reagent capable of binding a member from the group consisting of said analyte substance and a labelled specific binding material, and at which the presence or amount of immobilized labelled specific binding material may be detected; and (3) a downstream zone free of said immobilized reagent disposed downstream from said reaction site,

a sample application means selected from the group consisting of a well and an absorbant pad located adjacent to and disposed in fluid contact with said prefiltering zone of said chromatographic medium and offset upstream from said reaction site, and

a liquid absorption means consisting of a quantity of blotter material disposed in fluid contact with said downstream zone of said chromatographic medium and offset downstream from said reaction site.

7. A method for determining the presence or amount of an analyte substance in a sample which method utilizes a device comprising:

a chromatographic medium which extends throughout said device, defining a flowpath having capillarity and the capacity for chromatogrpahic solvent transport of one or more non-immobilized reagents and reactive sample components, said chromatographic medium comprising (1) a prefiltering zone; (2) a reaction site disposed downstream from said prefiltering zone at which is present an immobi-

lized reagent capable of binding a member from the group consisting of said analyte substance and a labelled specific binding material, and at which the presence or amount of immobilized labelled specific binding material may be detected and (3) downstream zone free of said immobilized reagent disposed downstream from said reaction site,

a sample application means selected from the group consisting of a well and an absorbant pad located adjacent to and disposed in fluid contact with said prefiltering zone of said chromatographic material and offset upstream from said reaction site, and

a liquid absorption means consisting of a quantity of blotter disposed in fluid contact with said downstream zone of said chromatogrpahic medium and offset downstream from said reaction site, said method comprising:

(a) applying a volume of said sample to said sample application means whereby said sample is transported onto said chromatographic medium at said prefiltering zone and along said chromatographic medium through said reaction site, and said downstream zone to said sample absorption means,

(b) contacting said labelled specific binding material to said reaction site, and

(c) determining the presence or amount of labelled specific binding material immobilized at said reaction site as an indication of the presence or amount of the analyte substance in the sample.

4,956,303

SECONDARY ANTIBODIES AGAINST COMPLEXES OF SMALL MOLECULES AND BINDING PARTNERS THEREFOR, THEIR PREPARATION, AND THEIR USE IN DIAGNOSTIC METHODS

Colin H. Self, London, United Kingdom, assignor to Antibody Technology Limited, United Kingdom

Filed Apr. 28, 1987, Ser. No. 43,377
Int. Cl.[5] G01N *33/537*
U.S. Cl. 436—542 **19 Claims**

1. A secondary antibody capable of stabilizing the binding of a small molecule of molecular weight 100–1500 to its binding protein which secondary antibody is capable of binding said binding protein in the presence of and in the absence of the small molecule but is not capable of binding said small molecule in the absence of said binding protein.

4,956,304

BURIED JUNCTION INFRARED PHOTODETECTOR PROCESS

Charles A. Cockrum; Jeffrey B. Barton, both of Goleta, and Eric F. Schulte, Santa Barbara, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Apr. 7, 1988, Ser. No. 178,680
Int. Cl.[5] H01L *21/10, 21/329*
U.S. Cl. 437—5 **30 Claims**

1. A method of fabricating an IR responsive photodiode or an array thereof comprising the steps of:

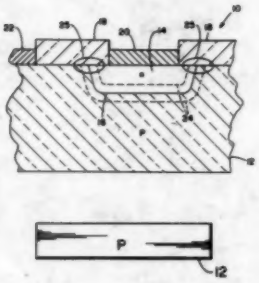
providing a substrate layer comprised of a Group II–IV semiconductor material having a first type of electrical conductivity and a characteristic energy bandgap;

forming a passivation layer over a surface of the substrate layer, the passivation layer having a characteristic energy bandgap which is wider than the characteristic energy bandgap of the substrate layer;

depositing a first mask layer over the passivation layer, the first mask layer having one or more openings therethrough for defining one or more individual photodiodes;

selectively removing portions of the passivation layer exposed through the openings within the first mask layer thereby exposing portions of the underlying substrate layer, the step of selectively removing simultaneously converting a top surface region of the exposed portions of the substrate layer to an opposite type of electrical conductivity, thereby forming a p-n diode junction, the step of selectively removing further simultaneously cleaning a top surface of the converted top surface region for preparing the exposed portions of the underlying substrate layer for a subsequent metallization step;

depositing a layer of metallization over exposed surfaces of the first mask layer, the passivation layer and the converted top surface regions of the substrate layer, the step



of depositing a layer of metallization occurring within a same processing chamber means as occurred the step of selectively removing, the step of depositing a layer of metallization further occurring before the substrate layer is removed from the processing chamber means; and

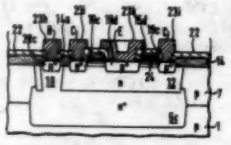
removing the first mask layer and the associated overlying metallization layer for forming individual photodiodes having contact metallization deposited thereon.

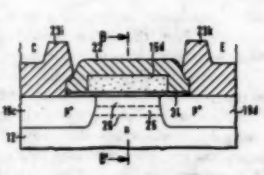
4,956,305

PROCESS FOR FABRICATING AN INTEGRATED CIRCUIT

Jürgen Arndt, Dornberg, Fed. Rep. of Germany, assignor to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Division of Ser. No. 46,534, May 6, 1987, Pat. No. 4,829,356. This application Apr. 14, 1989, Ser. No. 337,945
Claims priority, application Fed. Rep. of Germany, May 30, 1986, 3618155
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—31 **9 Claims**





1. In a process for the manufacture of an integrated circuit including a lateral transistor arranged together with compli-

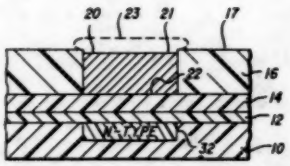
mentary vertical bipolar transistors and CMOS field-effect transistors in a semiconductor body which is common to all components, and wherein the lateral transistor is comprised of two spaced regions of a first conductivity type, which constitute the emitter region and the collector region, incorporated into the surface of a semiconductor region of a second conductivity type, with the portion of the semiconductor region of the conductivity type located between the emitter and collector regions constituting the active base region of the transistor and with the active base region including a buried semiconductor zone which is disposed below and spaced from the surface, which extends to the emitter and collector regions, and which contains additional counterdoping impurities relative to the conductivity of the remaining surrounding portions of the active base region, thus concentrating the minority charge carriers in the active base region at a distance from the semiconductor surface between the emitter region and the collector region; the improvement comprising: simultaneously forming the buried semiconductor zone in the active base region of the lateral transistor and setting the threshold voltage of the CMOS field-effect transistors by ion implantation of charge carriers through a gate passivation layer covering the semiconductor surface.

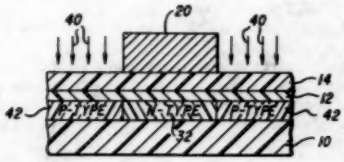
4,956,306

METHOD FOR FORMING COMPLEMENTARY PATTERNS IN A SEMICONDUCTOR MATERIAL WHILE USING A SINGLE MASKING STEP

Robert T. Fuller, Durham; Joseph C. Tsang, Raleigh, and William R. Richards, Jr., Cary, all of N.C., assignors to Harris Corporation, Melbourne, Fla.

Filed Nov. 3, 1988, Ser. No. 266,756
Int. Cl.[5] H01L 21/265
U.S. Cl. 437—34 **19 Claims**





1. A method for fabricating complementary regions in a semiconductor material while using a single masking step, comprising:

forming a protective layer on a portion of the semiconductor material;

forming an affinity layer on a portion of the protective layer, the affinity layer having an affinity for a second implant blocking material, the second implant blocking material comprising tungsten;

forming a first implant blocking layer on a portion of the affinity layer;

masking a predetermined portion of the first implant blocking layer for forming a first pattern of the unmasked portion of the first implant blocking layer;

removing a part of the unmasked first implant blocking layer in the first pattern for exposing an underlying first part of the affinity layer;

implanting a first dopant at the exposed first part of the affinity layer into the underlying semiconductor material;

removing the masking for exposing a portion of the predetermined portion of the first implant blocking layer;

forming a second implant blocking layer from the second implant blocking material over a portion of the exposed first part of the affinity layer;

removing the first implant blocking layer for exposing an underlying second part of the affinity layer, the exposed second part of the affinity layer constituting a second pattern; and

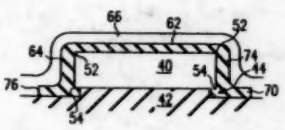
implanting a second dopant at the exposed second part of the affinity layer into the underlying semiconductor material.

4,956,307

THIN OXIDE SIDEWALL INSULATORS FOR SILICON-OVER-INSULATOR TRANSISTORS

Gordon P. Pollack; Mishel Matioubian, both of Dallas, and Ravishankar Sundaresan, Garland, all of Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Nov. 10, 1988, Ser. No. 269,803
Int. Cl.[5] H01L 21/265
U.S. Cl. 437—40 **16 Claims**



1. A method of forming a radiation hard transistor comprising:

forming a mesa from semiconductor material;

forming an insulated region adjacent to said mesa;

forming a conforming oxidizable layer on the sides of said insulator region;

anisotropically etching said oxidizable layer; and

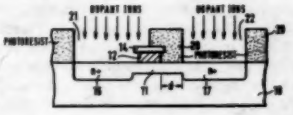
oxidizing said oxidizable layer to create oxide sidewalls.

4,956,308

METHOD OF MAKING SELF-ALIGNED FIELD-EFFECT TRANSISTOR

Edward L. Griffin; Robert A. Sadler, and Arthur E. Geisberger, all of Roanoke, Va., assignors to ITT Corporation, New York, N.Y.

Filed Jan. 20, 1987, Ser. No. 4,992
Int. Cl.[5] H01L 21/338
U.S. Cl. 437—41 **1 Claim**



1. An improved GaAs FET manufacturing process including the ordered steps of:

(a) providing a substrate comprising a GaAs region on a first major surface of said substrate, said GaAs region including a channel region;

(b) providing a gate over said channel region, said gate having a first lateral edge and a second lateral edge;

(c) providing an implant mask extending laterally over said channel region beyond said second lateral edge of said gate, said mask having source and drain implant openings; and

(d) introducing impurities via said implant openings into said GaAs region to form source and drain regions, said drain region laterally spaced from said second lateral edge of said gate as a result of said lateral extension of said mask wherein said step of providing an implant mask extending laterally over said channel region beyond said second lateral edge of said gate comprises:

providing a layer of photoresist over said substrate; and

patterning said photoresist such that said photoresist extends laterally over said channel region beyond said second lateral edge of said gate and does not extend laterally over said channel region beyond said first lateral edge of said gate.

4,956,309

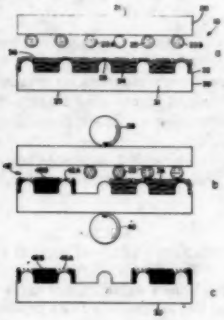
MICROROUGHENED DEVELOPER SHEET FOR FORMING HIGH DENSITY IMAGES

Paul C. Adair, Springboro, and Cheryl L. Moore, Springfield, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Dec. 6, 1988, Ser. No. 280,420

Int. Cl.[5] G03C *1/96, 1/68, 7/00*

U.S. Cl. 430—138 **12 Claims**



1. A developer sheet useful in forming images having a high density comprising a support which comprises a transparent polymeric material or a polymer coated paper material having front and back surfaces wherein said transparent polymer material or polymer coated paper material is microroughened to provide a discontinuous texture having alternating regions of relatively high and relatively low sheet thickness wherein the space between adjacent high sheet thickness region is between about 10 microns and about 40 microns; and a developer layer containing a particulate reactive material on said front surface, the majority of said particles being located between said adjacent high sheet thickness regions, said reactive material being capable of reacting with a substantially colorless chromogenic material upon contact and generating an image.

4,956,310

SEMICONDUCTOR MEMORY DEVICE AND FABRICATING METHOD THEREOF

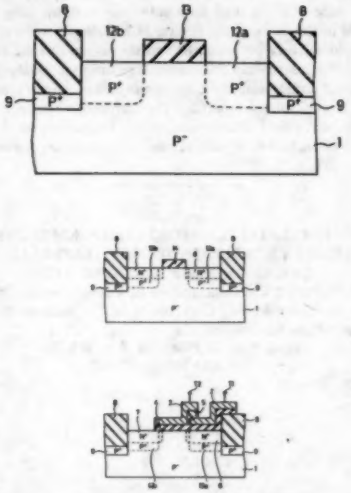
Akira Tokui; Shinichi Sato; Akira Kawai; Masayuki Nakajima; Hiroji Ozaki, and Masao Nagatomo, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 931,584, Nov. 14, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 195,672

Claims priority, application Japan, Dec. 16, 1985, 60-284628

Int. Cl.[5] H01L *21/32, 21/426*

U.S. Cl. 437—52 **4 Claims**



1. A method of forming a semiconductor memory device, comprising

preparing a semiconductor substrate of a first conductivity type;

forming a resist layer on said substrate and developing said layer to form a first resist pattern;

forming highly doped regions of the first conductivity type with said first resist pattern;

developing again said first resist pattern to form a second resist pattern; and

forming a charge storage region and a bit line region of a second conductivity type with said second resist pattern, said charge storage region and said bit line region being formed wider and shallower than said highly doped regions respectively.

4,956,311

DOUBLE-DIFFUSED DRAIN CMOS PROCESS USING A COUNTERDOPING TECHNIQUE

Tian-I Liou, and Chih-Sieh Teng, both of San Jose, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 27, 1989, Ser. No. 371,788

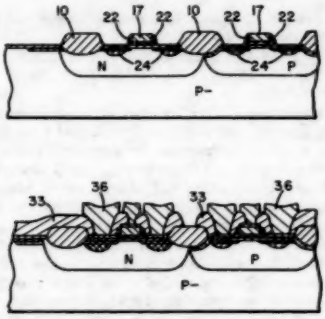
Int. Cl.[5] H01L *21/336*

U.S. Cl. 437—57 **18 Claims**

10. In a method of manufacturing a double-diffused drain CMOS device comprising a semiconductor substrate containing one impurity type into which an implant of the opposite polarity type is performed through the exposed area of a composite mask to form a plurality of wells; removing the mask

and performing an implant of the same polarity type as that in the substrate; defining a plurality of active regions within the n- and p-wells wherein the intended carrier charge of each active region is opposite in polarity to the well into which it is disposed; growing an isolating thermal oxide; performing a threshold voltage-determining implant and growing a gate oxide in the active regions; forming gate structures overlying portions of the active regions; forming contacts through a low temperature dielectric film deposited over the substrate by etching areas exposed by a contact mask; and forming a metal interconnect through which access to the device may be achieved;

the improvement which comprises:



performing a low energy blanket implant of a low dosage of a first type of n-type dopant following the formation of doped polysilicon features;

forming spacers adjacent to exposed edges of said gate structures;

performing a low energy blanket implant of a medium dosage of a second type of n-type dopant;

performing a medium energy, high dosage implant of p-type dopant into p-channel regions exposed by a p+ mask; and

forming a salicide in the p-channel and n-channel active regions by depositing a metal and exposing said substrate to a siliciding temperature treatment.

4,956,312

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

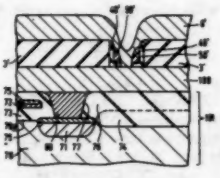
Josephus M. F. G. Van Laarhoven, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 19, 1989, Ser. No. 354,001

Claims priority, application United Kingdom, Jun. 6, 1988, 8813303

Int. Cl.[5] H01L *21/88*

U.S. Cl. 437—180 **8 Claims**



1. A method of manufacturing a semiconductor device comprising the steps of

(a) providing a covering layer over an electrically conductive layer,

(b) forming at least one opening in said covering layer to expose said electrically conductive layer,

(c) forming a further layer on said covering layer and into said opening to cover said electrically conductive layer, said further layer comprising at least a first layer of one material, said first layer having a first thickness, and at least a second layer of a different material on said first layer, said second layer being of a second thickness,

(d) anisotropically etching said further layer to etch said first layer and said second layer at different etching rates, said first layer being etched more slowly than said second layer,

(e) continuing said anisotropic etching until said further layer is removed from said covering layer, and said further layer is removed at least partially from said electrically conductive layer in said opening, at least a first portion of said first layer and at least a second portion of said second layer remaining on side walls of said opening, said first portion of said first layer covering said side walls of said opening from said electrically conductive layer to a top of said covering layer, said second portion of said second layer extending from said electrically conductive layer to a distance less than a depth of said opening, said distance being related to said first thickness of said first layer and to the different rates of etching of said first layer and said second layer, and

(f) providing another electrically conductive layer on said covering layer and into said opening to form an electrical contact with remaining exposed portions of said electrically conductive layer.

4,956,313

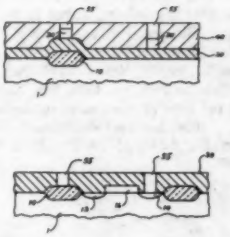
VIA-FILLING AND PLANARIZATION TECHNIQUE

William J. Cote, Essex Junction; Carter W. Kaanta, Colchester; Michael A. Leach, Winooski, and James K. Paulsen, Jericho, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 85,836, Aug. 17, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 257,117

Int. Cl.[5] H01L *21/321, 21/304*

U.S. Cl. 437—203 **10 Claims**



1. A method of forming a plurality of conductive studs within an insulator layer disposed between a first series of conductive structures arranged on a substrate and a second series of conductive structures formed on an upper surface of the insulator layer, comprising the steps of:

forming the insulator layer on the substrate, the insulator layer having a non-planar upper surface;

defining vias through said non-planar upper surface of the insulator layer, so as to expose at least one of said plurality of first conductive structures disposed on the substrate;

depositing a conductive layer on said non-planar upper surface of the insulator layer, said conductive layer com-

pletely filling said vias to contact said one of said plurality of first conductive structures, said conductive layer having a non-planar upper surface that substantially follows the topology of said non-planar upper surface of the insulating layer; and then

subjecting both of said non-planar upper surface of said conductive layer and said non-planar upper surface of the insulator layer to a single polish etch step in the presence of an abrasive slurry, so as to remove portions of said conductive layer laying outside of said apertures in the insulator layer while simultaneously removing appreciable portions of said non-planar upper surface of the insulator layer so as to establish planarity in said upper surface of the insulator layer.

4,956,314

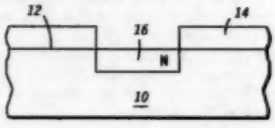
DIFFERENTIAL ETCHING OF SILICON NITRIDE

Gordon Tam, Chandler; Ronald N. Legge, Scottsdale, both of Ariz., and Wayne M. Paulson, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 357,844

Int. Cl.[5] H01L *21/311, 21/311.5*

U.S. Cl. 437—241 **17 Claims**



1. A method for differentially etching silicon nitride comprising the steps of:

forming a silicon nitride layer in an essentially hydrogen-free environment;

implanting hydrogen into various regions of said silicon nitride layer; and

differentially etching said silicon nitride layer.

4,956,315

WHISKER REINFORCED CERAMICS AND A METHOD OF CLAD/HOT ISOSTATIC PRESSING SAME

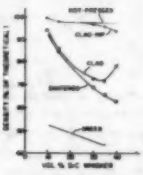
Pankaj K. Mehrotra, Greensburg; Joyce L. Swiokla, Ligonier, and Elizabeth R. Billman, Pittsburgh, all of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Division of Ser. No. 92,118, Sep. 2, 1987, Pat. No. 4,820,663. This application Nov. 16, 1988, Ser. No. 272,200

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[5] C04B *35/56, 35/62, 35/80*

U.S. Cl. 501—87 **29 Claims**



1. A fired ceramic composition comprising a matrix phase and a carbide whisker phase, and a nitrogen containing phase formed as a reaction product of said carbide whisker phase with nitrogen, said carbide whisker phase forming 12.5 to 40 volume percent of said fired ceramic composition, the X-ray parameter of whisker orientation being within the range 0.66 to 1.5, and the density of the fired ceramic composition exceeding 95 percent theoretical.

11. A cutting tool comprising: a fired ceramic composition having a matrix phase, a ceramic whisker phase and a nitrogen containing phase formed as a reaction product of said ceramic whisker phase with nitrogen; said ceramic whisker phase forming 12.5 to 40 volume percent of said fired ceramic composition; and wherein the x-ray parameter of whisker orientation being within the range of 0.66 to 1.5; the density of said fired ceramic composition exceeding 95 percent theoretical; and said fired ceramic composition having a cutting edge at a junction of a rake face and a flank face.

4,956,316

PROCESS FOR DISPERSING SILICON CARBIDE WHISKERS

Linda C. Sawyer, Chatham, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Apr. 25, 1988, Ser. No. 185,676

Int. Cl.[5] C04B *35/56, 35/58, 35/76, 35/10*

U.S. Cl. 501—88 **50 Claims**

18. In a method of forming a whisker-reinforced ceramic composite wherein said whiskers are selected from the group consisting of silicon carbide and silicon nitride and are mixed with ceramic powder and the mixture shaped to form a whisker-reinforced ceramic article and wherein the whiskers readily agglomerate rendering uniform mixing difficult, the improvement comprising: deagglomerating said whiskers prior to or simultaneous with said mixing by dispersing said whiskers in an aqueous silane dispersant comprising an effective amount of a silane, a cationic lubricant and sufficient acid to protonate said lubricant, said silane containing at least one nonreactive hydrocarbon group bonded to the silicon atom of said silane and at least one silicon-bonded group reactive with silicon.

39. A method of deagglomerating silicon-containing whiskers selected from the group consisting of silicon carbide and silicon nitride comprising mixing said whiskers with an aqueous silane dispersant comprising effective amounts of a silane, a cationic lubricant and sufficient acid to protonate said lubricant, said silane containing at least one nonreactive hydrocarbon group bonded to the silicon atom of said silane and at least one silicon-bonded group reactive with silicon.

4,956,317

WHISKER-REINFORCED CERAMICS

Hitoshi Yokoi, Ama; Masakazu Watanabe, Nagoya; Akiyasu Okuno, Kani, and Satoshi Iio, Konan, all of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 29, 1988, Ser. No. 277,374

Claims priority, application Japan, Dec. 1, 1987, 62-303829; May 25, 1988, 63-127687

Int. Cl.[5] C04B *35/58*

U.S. Cl. 501—92 **57 Claims**

20. A whisker-reinforced ceramic consisting essentially of 5–40 weight % SiC including SiC whiskers, 1–30 weight % of alumina and optionally oxides of elements selected from the group consisting of Sc, Y and rare earth elements, and the balance being silicon oxynitride constituents, wherein said SiC whiskers are present in an amount of no less than 5 weight % of the total ceramic and wherein at least some of the alumina and silicon oxynitride constituents have reacted to form O'-sialon.

4,956,318

CERAMIC CUTTING TOOL

David Moskowitz, Southfield, Mich., and Reuven Porat, Nahariya, Israel, assignors to Iscar Ceramics, Inc., Livonia, Mich.

Filed Nov. 20, 1989, Ser. No. 438,187

Int. Cl.[5] C04B *35/58*

U.S. Cl. 501—96 **5 Claims**

3. In a method of cutting ferrous metal wherein a cutting tool is brought into contact with a ferrous metal workpiece and

the cutting tool and ferrous metal workpiece move relative to each other whereby metal is removed by the cutting tool from the metal workpiece, the improvement comprising using a hot pressed composite cutting tool consisting essentially of alpha alumina and 6 to 30 weight % aluminum nitride.

4,956,319

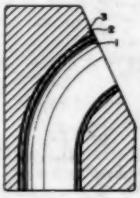
COMPLIANT LAYER

Ratnesh K. Dwivedi, Wilmington, and Virgil Irick, Jr., Hockessin, both of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Division of Ser. No. 116,412, Nov. 3, 1987, Pat. No. 4,849,266. This application Jan. 18, 1989, Ser. No. 298,613

Int. Cl.[5] C04B *35/02, 35/10, 35/16, 35/18*

U.S. Cl. 301—127 **23 Claims**



1. A method of making a ceramic-metal composite body comprising:

forming a ceramic article having an outer surface;

adhering to at least a portion of the outer surface of said ceramic article a coating composition comprising plaster of paris and a filler material;

casting molten metal around said ceramic article having said coating thereon; and

solidifying said molten metal to yield a ceramic-metal composite body.

4,956,320

POSITIVE TEMPERATURE COEFFICIENT SEMICONDUCTOR CERAMIC

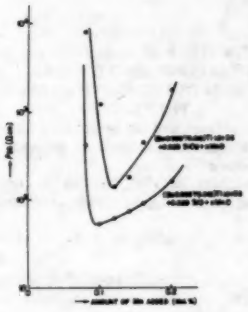
Masahiro Asakura, and Akihiko Igawa, both of Kami, Japan, assignors to Kurabe Industrial Co., Ltd., Shizuoka, Japan

Filed Feb. 13, 1989, Ser. No. 309,657

Claims priority, application Japan, Mar. 1, 1988, 63-48417

Int. Cl.[5] C04B *35/46*

U.S. Cl. 501—137 **6 Claims**



1. A positive temperature coefficient semiconductor ceramic, comprising:

from 0.2 to 12 mole % of silicon monoxide added to a barium titanate semiconductor ceramic which has been made into a semiconductor by the addition of a trace amount of a semiconductor agent selected from the group consisting of a rare-earth element, Ta, W, Y, Sb, Bi, and Nb.

4,956,321

SURFACE PACIFIED WOLLASTONITE

Jeffery L. Barrall, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jun. 16, 1988, Ser. No. 207,227

Int. Cl.[5] C04B *12/02, 33/02*

U.S. Cl. 501—146 **20 Claims**

1. A method for pacifying wollastonite comprising the steps:

(a) reacting the wollastonite in an aqueous acid medium to convert its surface by reaction with the acid further providing that the acid gives the wollastonite a displaceable anion without altering crystal structure, and

(b) drying the wollastonite wherein, step (b) terminates the step (a) reaction, to provide a pacified product wherein 2% by weight or less of the total wollastonite is reacted.

4,956,322

IMPROVEMENTS TO SOLID GRANULAR CATALYSTS, PROCESS FOR THEIR PREPARATION

Jean P. Gouzard, Rueil-Malmaison, and Georges Szabo, Montivilliers, both of France, assignors to Compagnie de Raffinage et de Distribution Total France, Levallois-Perret, France

Filed Oct. 7, 1988, Ser. No. 255,709

Claims priority, application France, Oct. 7, 1987, 87 13846

Int. Cl.[5] B01J *29/06, 37/02*

U.S. Cl. 502—62 **12 Claims**

2. A solid granular catalyst comprising catalyst granules coated with a continuous removable protective film of a material that is impermeable to gases and moisture and inert to the constitutes of said catalyst, said protective film comprising a mixture of from 95% to 90% by weight of at least one saturated hydrocarbon having a melting point of 40° C. to 120° C. and from 5% to 10% by weight of a polyethylene wax having a molecular weight of 500 to 10,000.

7. A catalyst as defined in claim 2, comprising a support selected from the group consisting of alumina, silica, the aluminosilicates, the zeolites, magnesia zirconia, the oxides of gallium, titanium, thorium and boron, or a mixture of these oxides, and at least one active compound selected from the group consisting of Lewis acids, hydrolyzable metals, and pyrophoric sulfides.

4,956,323

CATALYSTS PREPARED FROM TETRAKIS(DIALKYLAMIDE OR DIARYLAMIDE) DERIVATIVES OF TITANIUM AND POLYMERIZATION OF OLEFINS THEREWITH

John G. Hefner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 295,855, Jan. 11, 1989, Pat. No. 4,892,914, which is a continuation-in-part of Ser. No. 236,691, Aug. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 126,331, Nov. 30, 1987, abandoned. This application Sep. 8, 1989, Ser. No. 404,724

Int. Cl.[5] C08F *4/64*

U.S. Cl. 502—113 **8 Claims**

1. A supported catalyst which comprises the product resulting from mixing in a suitable inert diluent or solvent

(A) an inorganic support;

(B) a metal-containing reducing agent;

(C) a transition metal compound selected from the group consisting of a titanium tetrakis(dialkylamide) or titanium tetrakis(diarylamide) or a combination thereof; wherein in the preparation of the catalyst, all of components (A) and (B) are added prior to the addition of component (C) and the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 2:1 to about 160:1:

an atomic ratio of Mr:Tm of from about 1:1 to about 64:1; and wherein Ms represents the metal atoms in the support material, Mr represents the metal atoms in the reducing agent and Tm represents the sum of the transition metal atoms in the transition metal component.

2. A supported catalyst of claim 1 wherein the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 8:1 to about 80:1 and an atomic ratio of Mr:Tm of from about 2:1 to about 32:1.

3. A supported catalyst of claim 2 wherein the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 11:1 to about 40:1 and an atomic ratio of Mr:Tm of from about 4:1 to about 16:1

6. A supported catalyst of claim 1, 2 or 3 wherein the transition metal component (C) additionally contains at least one zirconium or hafnium compound selected from a zirconium tetrakis(dialkylamide), a zirconium tetrakis(diarylamide), a hafnium tetrakis(dialkylamide), a hafnium tetrakis(diarylamide), or any combination thereof; wherein the atomic ratio of (Zr+Hf) to (Ti+Zr+Hf) is from about <0:1 to about 0.9:1.

4,956,324

CATALYST CONTAINING DIPOLAR COMPOUNDS USEFUL FOR SWEETENING A SOUR HYDROCARBON FRACTION

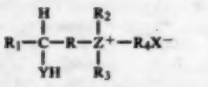
Sheila Pollastrini, Bloomingdale; Jeffery C. Bricker, Buffalo Grove, and Robert R. Frame, Glenview, all of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 386,923, Jul. 31, 1989. This application Feb. 1, 1990, Ser. No. 473,512

Int. Cl.[5] B01J *31/22*

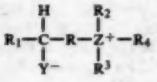
U.S. Cl. 502—163 **18 Claims**

1. A catalyst effective for oxidizing mercaptans present in a sour hydrocarbon fraction comprising a basic solution containing a metal chelate and a promoter which is a dipolar compound having the structural formula



(A)

where Z is nitrogen or phosphorus, R is a linear alkyl group having from one to about 18 carbon atoms, R_1 and R_2 are each individually hydrogen or a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, R_3 and R_4 are each individually a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, YH is an electronegative group selected from the group consisting of OH, SH, COOH, SO_3H and NH_2, the electronegative group characterized in that it is capable of being deprotonated in a basic solution, and X is an anion selected from the group consisting of the halogens and hydroxide; or the structural formula



(B)

where Y^- is the deprotonated form of YH.

4,956,325

METHOD OF IMPREGNATING A SUPPORT MATERIAL

Binh Ngoc Le, Humble, Tex., assignor to Merichem Company, Houston, Tex.

Filed Mar. 23, 1989, Ser. No. 327,557

Int. Cl.[5] B01J *31/12*

U.S. Cl. 502—163 **18 Claims**

1. A process for impregnating a support material with a metal phthalocyanine oxidation catalyst which comprises:

contacting said support material with an aqueous impregnating solution of said metal phthalocyanine dissolved in a monoalkanol amine.

4,956,326

METHOD FOR DEHALOGENATION OF A HALIDE AND CATALYST USED THEREFOR

Noriyuki Yoneda; Toshiji Makabe; Jun Kaita; Munekazu Nakamura; Yoshiko Endoh; Hidehiko Kudoh, and Shunji Higashi, all of Kanagawa, Japan, assignors to Chiyoda Chemical Engineering & Construction Co., Ltd., Kanagawa and Nippon Kokan Co., Ltd., Tokyo, both of, Japan

Filed Jul. 10, 1987, Ser. No. 71,964

Claims priority, application Japan, Jul. 10, 1986, 61-160891; Jul. 10, 1986, 61-160892; Oct. 2, 1986, 61-233297

Int. Cl.[5] B01J *27/224*

U.S. Cl. 502—1.78 **10 Claims**

1. A catalyst for dehalogenation of a halide comprising a corrosion-resistant ceramic or graphite having a surface area of 5.0 m^2/g or less and, supported thereon, at least one member selected from the group consisting of a platinum group metal and a silicide thereof.

4,956,327

MIXED BASIC METAL OXIDE/SULFIDE CATALYST

Erek J. Erekson, LaGrange; Anthony L. Lee, Glen Ellyn; S. Peter Barone, Hoffman Estates, and Irvine J. Solomon, Highland Park, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed May 31, 1989, Ser. No. 359,500

Int. Cl.[5] B01J *23/02, 23/04, 23/20*

U.S. Cl. 502—216 **21 Claims**

1. A mixed basic metal oxide/sulfide catalyst having the formula:

$$xA.yB.zC.qD$$

wherein

A is an alkali metal selected from lithium, sodium, potassium, rubidium, cesium and mixtures thereof;

B is a cation which has an ionization state 2 and 3 greater than the ionization state of C;

B is selected from hafnium, tantalum, niobium, vanadium and mixtures thereof;

C is selected from magnesium, calcium, strontium, barium, and mixtures thereof;

D is selected from oxygen, sulfur and mixtures thereof;

x and y are in mole fractions of z such that when z=1 then x=0.001 to 0.25, and y=0.001 to 0.25; and

q is a number necessary to maintain charge balance with D.

4,956,328

PROCESS FOR THE PREPARATION OF CATALYST COMPOSITIONS CONTAINING NICKEL, ALUMINA, AND ZIRCONIUM DIOXIDE AND CATALYSTS MADE THEREFROM

Carl D. Frohning, Wesel, and Gerhardt Horn, Oberhausen, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 325,661

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811038

Int. Cl.[5] B01J *21/04, 21/06, 23/74*

U.S. Cl. 502—242 **70 Claims**

1. A process for the preparation of a composition comprising precipitation from an aqueous starting solution of a mixture of nickel, aluminum, and zirconium salts by means of an aqueous precipitating solution containing an amount of a basic compound, said amount being in stoichiometric excess of that required for complete precipitation of said salts, said precipitation being carried out at a precipitation temperature of at least

60° C. and a precipitation pH of 7 to 10, and depositing said composition onto a support.

4,956,329

HIGH SURFACE AREA CORDIERITE CATALYST SUPPORT STRUCTURES

Tai-Hsiang Chao, Mt. Prospect; Michael W. Schoonover, Arlington Heights, and Gerald T. Stranford, Palatine, all of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 28, 1988, Ser. No. 276,610
Int. Cl.[5] B01J 21/00, 32/00
U.S. Cl. 502—251 26 Claims

1. A catalyst support structure consisting essentially of a substantially polycrystalline cordierite phase having a chemical composition by weight of 6–15% MgO, 33–40% Al_2O_3 and 45–56% SiO_2, the structure characterized in that it has a surface area of at least 2.7 m^2/g, a compressive strength of at least 31 MPa, a thermal expansion coefficient smaller than 5.2×10^{-6} m/m/° C. over the temperature range 23°–800° C. and a porosity of at least 20%.

5. A method of preparing a catalyst support structure consisting essentially of:

(a) coprecipitating salts of aluminum, magnesium and silicon in a basic medium to provide a homogeneous mixture of said salts;

(b) treating the homogeneous mixture of salts to afford a dry mixture;

(c) passing a moldable mass comprising the dry mixture and a binder through a die to give a shaped article; and

(d) heating the shaped article at a temperature and for a time sufficient to provide a catalyst support structure comprising a polycrystalline cordierite phase having a surface area of at least 2.7 m^2/g.

26. In a catalytic composite comprising at least one catalytic metal dispersed on a support, wherein the improvement comprises a support consisting essentially of a substantially polycrystalline cordierite phase having a chemical composition by weight of 6–15% MgO, 33–40% Al_2O_3 and 45–56% SiO_2, having a surface area of at least 2.7 m^2/g, a compressive strength of at least 31 MPa, a thermal expansion coefficient smaller than 5.2×10^{-6} m/m/° C. over the temperature range of 23°–800° C. and a porosity of at least 20%.

4,956,330

CATALYST COMPOSITION FOR THE OXIDATION OF CARBON MONOXIDE

David J. Elliott, Bartlesville, and John H. Kolts, Ochelata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 19, 1989, Ser. No. 368,493
Int. Cl.[5] B01J 21/06, 23/78, 23/89
U.S. Cl. 502—326 23 Claims

1. A composition of matter consisting essentially of (a) a support material consisting essentially of titania, (b) platinum metal, (c) iron oxide, and (d) at least one compound of at least one alkali metal;

wherein said composition of matter is active as a catalyst for the oxidation of carbon monoxide with free oxygen to carbon dioxide at about 10°–50° C.; and said composition of matter contains components (b), (c) and (d) in amounts such that component (c) is a copromoter for component (b) on said support material in said oxidation at about 10°–50° C., and component (d) is a copromoter for the combination of components (b) and (c) on said support material in said oxidation at about 10°–50° C.

4,956,331

PROCESS FOR PRODUCING METAL SUPPORTED CATALYST HAVING HIGH SURFACE AREA

Kazunori Tsurumi, Tokyo; Toshihide Nakamura, Funabashi, and Akira Sato, Misato, all of Japan, assignors to Tanaka Kikinzoku Kogyo K.K., Japan

Filed Feb. 17, 1989, Ser. No. 312,702
Claims priority, application Japan, Feb. 18, 1988, 63-36249
Int. Cl.[5] B01J 21/18, 23/42, 23/44
U.S. Cl. 502—339 4 Claims

1. A process for producing a metal supported catalyst having a large surface area comprising:

reducing one or more metal containing ions in a solution to a corresponding metal or metals employing a solution of one or more reducing agents selected from the group consisting of sodium thiosulfate, potassium thiosulfate, ammonium thiosulfate, sodium metabisulfite, potassium metabisulfite and ammonium metabisulfite; the solution of reducing agent being initially added dropwise and all at once thereafter to assure the formation of nuclei for forming finely-divided catalyst particles; and

supporting the reduced metal or metals having a large surface area onto supports.

4,956,332

HEAT-SENSITIVE RECORDING MATERIAL

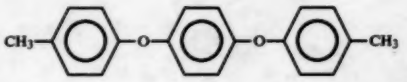
Yoshiyuki Takahashi, Kawasaki; Kunitaka Toyofuku, Sakura, and Akiko Iwasaki, Urawa, all of Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

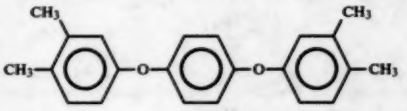
Filed Aug. 28, 1989, Ser. No. 399,054
Claims priority, application Japan, Nov. 2, 1988, 63-276186
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—209 4 Claims

1. A heat-sensitive recording material comprising:

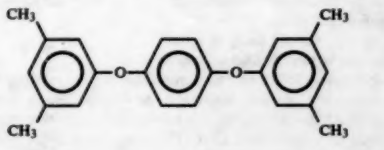
a substrate sheet; and

a heat-sensitive color-developing layer formed on at least one surface of the substrate sheet and comprising a substantially colorless dye precursor, a color developing agent capable of reacting with the dye precursor under heating to develop a color, a binder, and a heat-fusible sensitizing agent consisting essentially of at least one member selected from the 1,4-bis(alkylphenyloxy)benzenes of the formulae (I), (II) and (III):





and

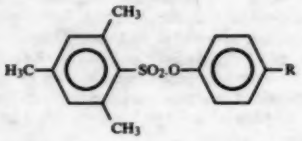


4,956,333
HEAT-SENSITIVE RECORDING MATERIAL

Kenichi Kawahara, Iwatsuki; Masaharu Nomura, Hasuda; Hiroaki Tsugawa, Matsudo, and Hirofumi Iwamoto, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 409,043
Claims priority, application Japan, Sep. 19, 1988, 63-232642
Int. Cl.[5] B41M *5/18*
U.S. Cl. 503—209 **1 Claim**

1. A heat sensitive recording material which comprises a support and a heat sensitive color-developing layer containing a leuco dye, and acidic substance and a compound represented by the formula (I),



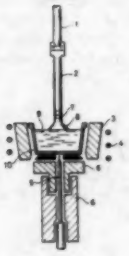
(I)

wherein R represents a hydrogen atom or a methyl group, a leuco dye and an acidic substance on a support.

4,956,334
METHOD FOR PREPARING A SINGLE CRYSTAL OF LANTHANUM CUPRATE

Kunihiko Oka, and Hiromi Unoki, both of Tsukuba, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 168,021
Claims priority, application Japan, May 1, 1987, 62-109517; May 1, 1987, 62-109518; May 1, 1987, 62-109519
Int. Cl.[5] C30B *15/30*
U.S. Cl. 505—1 **5 Claims**



1. A method for preparing a single crystal of lanthanum cuprate comprising the steps of:

mixing 28.9 to 7.1 mole % of at least one of lanthanum oxide and lanthanum carbonate and 71.1 to 92.9 mole % of copper oxide;

heating the mixture to form a melt;

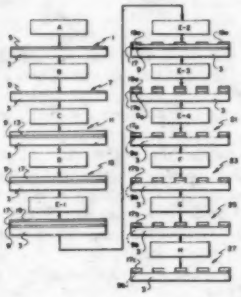
contacting a seed crystal to said melt; and

slowly cooling said melt and pulling said seed crystal so that a crystallite deposits on said seed crystal and a single crystal of lanthanum cuprate having a composition represented by the formula La_2CuO_4 grows from said crystallite.

4,956,335
CONDUCTIVE ARTICLES AND PROCESSES FOR THEIR PREPARATION

John A. Agostinelli, Rochester, and Gerrit Lubberts, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 20, 1988, Ser. No. 208,706
Int. Cl.[5] B32B *3/00*
U.S. Cl. 505—1 **31 Claims**

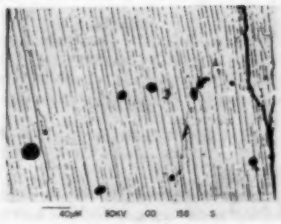


1. An article capable of forming on heating a superconducting thin film having a superconducting transition temperature of greater than 30° K. comprising a substrate capable of withstanding temperatures required to form said thin film and a mixed metal oxide layer capable of crystallizing to form said thin film on heating characterized in that a readily etchable, thin lift-off layer is interposed between said substrate and said mixed metal oxide layer and is selected from amoung copper, copper oxide and oxides and carbonates of alkaline earth metals which are components of said mixed metal oxide.

4,956,336
ORIENTED GRAINED Y-BA-CU-O SUPERCONDUCTORS HAVING HIGH CRITICAL CURRENTS AND METHOD FOR PRODUCING SAME

Kamel Salama, and Venkatakrishnan Selvamanickam, both of Houston, Tex., assignors to University of Houston - University Park, Houston, Tex.

Filed Feb. 10, 1989, Ser. No. 309,382
Int. Cl.[5] C01B *13/14*; C01F *11/02*; C01G *3/02*; C04B *35/60*
U.S. Cl. 505—1 **7 Claims**



1. A process for preparing a superconducting metal oxide complex comprising the steps of:

(a) mixing solid compounds containing Y, Ba, Cu and O in amounts appropriate to yield the formula $Y_1Ba_2Cu_3O_6+\delta$ wherein δ has a number value of from about 0.1 to about 1.0;

(b) heating the solid compounds in air to a temperature between about 920° C. to about 960° C. for a time sufficient to react the compounds in the solid state

(c) quenching the solid state reaction product to ambient temperature in air;

(d) compacting the mixture into a solid mass by application of pressure from about 9,000 to about 11,000 psi;
(e) sintering the solid mass in air at a temperature between about 920° C. to about 960° C.;
(f) heating the solid mass in a preheated chamber to a temperature of from about 1,090° C. to 1,200° C. for a time sufficient to partially melt and decompose said mass;
(g) rapidly cooling the mass to a temperature between about 1,020° to about 1,040° C. and then cooling said mass to a steady temperature between about 20° C. to 40° C. below its melting point at a rate of approximately 1° C./hour;
(h) maintaining the mass at said steady temperature for a time sufficient for the entire mass to resolidify;
(i) cooling said resolidified mass in air from said steady temperature to approximately 550° C. to 650° C. at the rate of approximately 60° C. per hour;
(j) additionally cooling the resolidified mass to about 380° C. to about 420° C. at the rate of approximately 30° C. per hour in air; and
(k) annealing the resolidified mass in an oxygen containing atmosphere for a time sufficient for the requisite amount of oxygen to diffuse into the mass.

4,956,337

NB-SI-AL-O SUPERCONDUCTORS WITH HIGH TRANSITION TEMPERATURES AND PROCESS FOR MANUFACTURING THE SAME

Tetsuya Ogushi, Kagoshima, Japan, assignor to Kagoshima University, Kagoshima, Japan

Continuation-in-part of Ser. No. 262,181, Oct. 20, 1988, abandoned, which is a continuation of Ser. No. 943,518, Dec. 17, 1986, abandoned. This application Jun. 16, 1989, Ser. No. 367,060

Claims priority, application Japan, Jan. 22, 1986, 61-11728

Int. Cl.[5] H01C *39/12;* **C23C** *14/34;* **B05D** *5/12*

U.S. Cl. 505—1 **11 Claims**

1. A superconductive material with a superconducting critical temperature of at least 77° K., having a composition of 20 atomic % niobium (Nb), 10 atomic % silicon (Si), 10 atomic % aluminum (Al) and 60 atomic % oxygen (O), which comprises crystalline grains of intermetallic compound comprising Nb, Si, and Al and having an Nb/Si atomic ratio of 2/1, said superconductive material containing oxides of Nb, Si and Al in the boundaries of said crystalline grains.

4,956,338

METHODS FOR FORMING COMPLEX OXIDATION REACTION PRODUCTS INCLUDING SUPERCONDUCTING ARTICLES

Robert A. Rapp, Columbus, Ohio; Andrew W. Urquhart, Newark; Alan S. Negelberg, and Marc S. Newkirk, Newark, all of Del., assigners to Lanxide Technology Company, LP, Newark, Del.

Continuation of Ser. No. 119,760, Nov. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 69,731, Jul. 6, 1987, abandoned. This application Jul. 6, 1988, Ser. No. 217,105

Int. Cl.[5] C04B *35/00*

U.S. Cl. 505—1 **47 Claims**

1. A method for producing a complex oxidation reaction product of two or more metals in an oxidized state, which comprises:
(a) positioning a parent metal source comprising at least one first metal of said two or more metals adjacent to a permeable mass comprising at least one metal-containing compound capable of reaction to form said complex oxidation reaction product in step (b) below, the metal component of said at least one metal-containing compound comprising at least a second of said two or more metals, and orienting said parent metal source and said permeable mass relative to each other so that formation of the complex oxidation reaction product will occur in a direction towards and into said permeable mass; and
(b) heating said parent metal source in the presence of a vapor-phase oxidant to a temperature region above its melting point to form a body of molten parent metal to permit infiltration and reaction of the molten parent metal into said permeable mass and with said vapor-phase oxidant and said at least one metal-containing compound to form said complex oxidation reaction product, without reduction of the metal component of said at least one metal-containing compound to elemental metal, and progressively drawing the molten parent metal source through the complex oxidation reaction product towards said vapor-phase oxidant and towards and into the adjacent permeable mass so that fresh complex oxidation reaction product continues to form within the permeable mass; and
(c) recovering the resulting complex oxidation reaction product.

4,956,339

METHOD FOR MANUFACTURING SUPERCONDUCTING CERAMICS IN A MAGNETIC FIELD

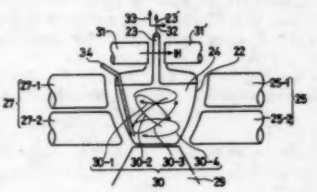
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Filed Sep. 20, 1988, Ser. No. 246,785

Claims priority, application Japan, Sep. 21, 1987, 62-236961

Int. Cl.[5] H01L *39/24*

U.S. Cl. 505—1 **9 Claims**



1. A method of fabricating single crystals of superconducting ceramics comprising:
melting a magnetic copper based oxide mixture conforming to a composition required for superconduction;
applying a magnetic field to said molten oxide mixture in a fixed direction;
freezing said molten mixture in said magnetic field and then forming a superconducting ceramic single crystal.

4,956,340

PROCESS FOR PREPARING COMPOUND METAL OXIDES OF YTTRIUM, BARIUM AND COPPER

Etsuji Kimura, Kasukabe; Nozomu Hasegawa, Omiya, and Yutaka Nishiyama, Kagawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 227,234, Aug. 1, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 432,316

Claims priority, application Japan, Jul. 31, 1987, 62-190201

Int. Cl.[5] C01F *11/02, 17/00;* **C01G** *3/02*

U.S. Cl. 505—1 **8 Claims**

1. A process for preparing a compound oxide of yttrium, barium and copper, comprising preparing an aqueous solution containing said yttrium, barium and copper in a content ratio corresponding to the composition of said compound oxide, adding oxalic acid to said aqueous solution to obtain a precipitate, and adjusting the pH of said aqueous solution to a value of 1.5 to 2.0, wherein said oxalic acid is added in an amount such that 0.05M/l to 0.1M/l of oxalate ions remain after precipitation of said yttrium, barium, and copper, and wherein the ratio yttrium:barium:copper in said solution is about 1:2:3, and collecting and firing said precipitate to obtain a compound oxide

in which the ratio of yttrium, barium and copper, respectively, is about 1:2:3.

4,956,341

3-TERT-BUTYL-40-METHOXYCYCLOHEXYLMETHANOL, ITS PREPARATION AND ITS USE AS A SCENT

Dieter Degner, Dannstadt-Schauernheim; Walter Gramlich, Edingen-Neckarhausen, and Ludwig Schuster, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 151,609, Feb. 2, 1988, abandoned. This application Mar. 21, 1989, Ser. No. 326,403

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705299

Int. Cl.[5] A61K *7/46*

U.S. Cl. 512—23 **2 Claims**

1. 3-tert-butyl-4-methoxycyclohexylmethanol.

2. A fragrance composition, comprising:

3-t-butyl-4-methoxycyclohexylmethanol in combination with the other ingredients of a cosmetic, cleanser or polish formulation.

4,956,342

ALKYLTETRAMETHYLCYCLOHEXANE DERIVATIVES AND THEIR USE AS PERFUMES

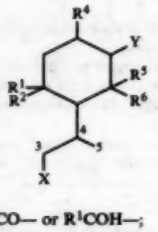
Philip A. Christenson, Midland Park, and Brian J. Drake, Clifton, both of N.J., assignors to BASF K & F Corp., Parsippany, N.J.

Division of Ser. No. 100,115, Sep. 23, 1987, Pat. No. 4,808,339. This application Mar. 23, 1989, Ser. No. 328,332

Int. Cl.[5] A61K *7/46*

U.S. Cl. 512—24 **10 Claims**

1. A fragrance oil comprising an aromatic spirit and an alkyltetramethylcyclohexane derivative of the formula



wherein X is H, R^1CO— or R^1COH—;

Y is H or R^1CO—;

R^1 is H or C_{1-4} alkyl;

R^2, R^3, R^4, R^5, and R^6 are C_{1-4} alkyl;

and ⎯ is a single or double bond;

provided that the carbon atom at position 4 can have only one double bond, that at least four of R^2, R^3, R^4, R^5, and R^6 are methyl, and that one but not both of X and Y is H.

4,956,343

CONTROL OF INSECTS BY ROSEOTOXIN B

Patrick F. Dowd, Peoria, Ill., and Richard J. Cole, Albany, Ga., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 2, 1988, Ser. No. 188,993

Int. Cl.[5] A61K *37/02*; C07K *11/02*

U.S. Cl. 514—11 **4 Claims**

1. A method of controlling insects comprising applying to a locus of said insects an insecticidally effective amount of roseotoxin B.

4,956,344

METHOD FOR TREATMENT OF LESIONS IN THE LARGE INTESTINAL EPITHELIUM WITH A TRIPEPTIDE

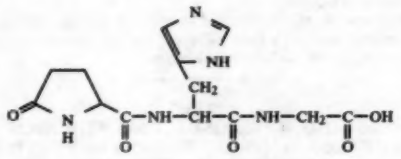
Teilef Fossli, Nissedal; Karl L. Reichelt; Oyvind Skraastad, both of Oslo, and Paul D. Edminson, Rykkinn, all of Norway, assignors to Hafslund Nycomed A/S, Oslo, Norway

Continuation of Ser. No. 098,059, Sep. 17, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 304,904

Int. Cl.[5] A61K *37/02*

U.S. Cl. 514—18 **1 Claim**

1. A method for treatment of hyperproliferative benign or malignant lesions in the large intestinal epithelium which comprises administering to a subject having such lesions an effective amount to treat such lesions of the tripeptide L-pyroglutamyl-L-histidylglycine of the formula:



wherein the pyroglutamyl and histidyl moieties are of the L-configuration.

4,956,345

2-ALKYNYLADENOSINES AS ANTIHYPERTENSIVE AGENTS

Tadashi Miyasaka, Yokohama; Akira Matsuda, Sapporo; Toichi Abiru, Sawara, and Haruhiko Machida, Choshi, all of Japan, assignors to Yamasa Shoyu Kabushiki Kaisha, Chiba, Japan

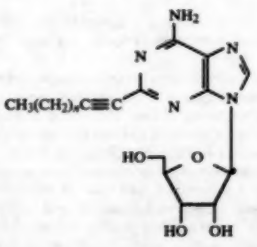
Continuation of Ser. No. 924,345, Oct. 24, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 282,892

Claims priority, application Japan, Oct. 25, 1985, 60-240137

Int. Cl.[5] A61K *31/70*; C07H *19/167*

U.S. Cl. 514—46 **4 Claims**

1. A method for treating hypertension in mammals suffering therefrom which comprises administering to such mammals an antihypertensive effective amount of a 2-alkynyladenosine represented by formula [I]:



[I]

wherein n is an integer of from 2 to 15, and a pharmaceutically acceptable carrier.

4,956,346

PYRIMIDINE DERIVATIVES AS AN ANTIVIRAL AGENT

Robert W. Lambert, Welwyn; Joseph A. Martin, Harpenden, and Gareth J. Thomas, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

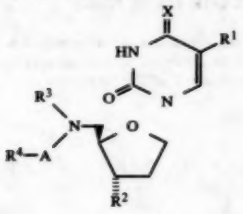
Division of Ser. No. 79,730, Jul. 30, 1987, Pat. No. 4,886,785. This application Sep. 29, 1989, Ser. No. 414,784

Claims priority, application United Kingdom, Aug. 12, 1986, 8619630

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—50 3 Claims

1. A method of controlling or preventing viral infections which comprises administering to a warmblooded animal in need of thereof an antivirally effective amount of a compound of the formula



I

wherein A is C_{1-8}-alkylene, R^1 is halogen, C_{1-4}-alkyl or halo-(C_{1-4}-alkyl), R^2 is hydrogen, hydroxy, C_{1-4}-alkanoyloxy, cyclopentylproprionyloxy, phenylacetoxy, or benzoyloxy, R^3 is hydrogen or C_{1-4}-alkyl, R^4 is unsubstituted phenyl or phenyl carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4} alkoxy, trifluoromethyl, nitro and phenyl or an unsubstituted phenyloxy or phenyloxy carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4}alkoxy, trifluoromethyl, nitro and phenyl and X is O or NH, or a tautomer thereof.

4,956,347

USE OF SULFOMUCOPOLYSACCHARIDES IN THE TREATMENT OF ALZHEIMER-TYPE SENILE DEMENTIA

Thomas A. Ban, Nashville, Tenn., and Umberto Cornelli, Milan, Italy, assignors to Crinos Industria Farmacobiologica Spa, Como, Italy

Filed May 23, 1988, Ser. No. 197,419

Claims priority, application Italy, May 28, 1987, 20698 A/87

Int. Cl.[5] A61K *31/715, 31/725*

U.S. Cl. 514—54 2 Claims

1. A method for the treatment of a patient suffering from Alzheimer-type senile dementia which comprises administering to the pateint 250–500 LPU-RU of ateroid per day to reduce the symptoms of said senile dementia.

4,956,348

STIMULATION OF TEAR SECRETION WITH CYCLIC NUCLEOTIDES

Jeffrey P. Gilbard, Boston, and Darlene A. Dartt, Newton, both of Mass., assignors to Eye Research Institute of Retina Foundation, Boston, Mass.

Division of Ser. No. 830,997, Feb. 19, 1986, Pat. No. 4,753,945. This application Jun. 27, 1988, Ser. No. 211,585

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—47 4 Claims

4. A method of stimulating in vivo fluid secretion from human accessory lacrimal glands comprising the step of topical administration of the ocular surface of a therapeutically effective amount of a preparation which includes a compound selected from the group consisting of 8-bromo-3',5'-cyclic adenosine monophosphate and 8-bromo-3',5'-cyclic guanosine monophosphate which compound causes an increase in the intracellular cyclic nucleotide levels in said accessory lacrimal glands.

4,956,349

ANTI-INFLAMMATORY FACTOR, METHOD OF ISOLATION, AND USE

Lee R. Beck, Lebanon, Ohio, assignor to Stolle Research & Development Corporation, Lebanon, Ohio

Continuation-in-part of Ser. No. 1,848, Jan. 9, 1987, Pat. No. 4,897,265, which is a continuation-in-part of Ser. No. 384,625, Jun. 3, 1982, abandoned, which is a division of Ser. No. 546,162, Oct. 27, 1983, Pat. No. 4,636,384, which is a division of Ser. No. 910,297, Sep. 17, 1986, which is a continuation of Ser. No. 576,001, Feb. 1, 1983, abandoned. This application Apr. 4, 1988, Ser. No. 177,223

Int. Cl.[5] A61K *31/715, 35/20;* C08B *37/00*

U.S. Cl. 514—54 23 Claims

1. An anti-inflammatory factor, in substantially pure form, produced by a process comprising:

(i) removing the fat from milk of a milk-producing animal to produce skimmed milk;

(ii) removing casein from said skimmed milk to produce whey;

(iii) removing from said whey macromolecules having a molecular weight greater than about 10,000 daltons;

(iv) fractionating the low-molecular weight product from the previous step by ion exchange chromatography;

(v) further purifying the anti-inflammatory factor from the previous step by molecular sieve chromatography; and

(vi) collecting said anti-inflammatory factor.

4,956,350

WOUND FILLING COMPOSITIONS

Deral T. Mosbey, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 18, 1988, Ser. No. 233,560

Int. Cl.[5] A61K *31/00;* C08B *37/00;* C08L *5/00*

U.S. Cl. 514—55 10 Claims

10. A method of treating a wound comprising applying to the wound a composition comprising:

(a) an amount of chitosan effective to promote healing or provide anti-microbial activity, or both,

(b) at least one compatible hydrocolloid material, other than chitosan, and

(c) water wherein said composition is a homogeneous gel having an initial viscosity suitable to allow it to be applied to and remain in said wound, yet said composition is neither formed by nor exhibits syneresis.

4,956,351

ANTIVIRAL PHARMACEUTICAL COMPOSITIONS CONTAINING CYCLODEXTRINS

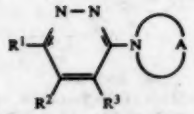
Jean L. Mesens, Wechelderzande, and Koenraad J. L. M. Andries, Beerse, both of Belgium, assignors to Janssen Pharmaceutica N.V. frame-543, Beerse, Belgium

Continuation-in-part of Ser. No. 68,512, Jul. 1, 1987, abandoned. This application Jun. 23, 1988, Ser. No. 210,677

Int. Cl.[5] A61K *9/18;* C08B *37/16*

U.S. Cl. 514—58 36 Claims

1. A pharmaceutical composition for treating a rhino viral infection in a mammal which comprises a cyclodextrin and an anti-rhinoviral agent, with the proviso that if the cyclodextrin is a γ-cyclodextrin ether or mixed ether, wherein the ether substituents are C_{1-6}alkyl, hydroxyC_{1-6}alkyl, carboxyC_{1-6}alkyl or (C_{1-6}alkyloxycarbonyl)C_{1-6}alkyl, then said agent is not of the following formula:



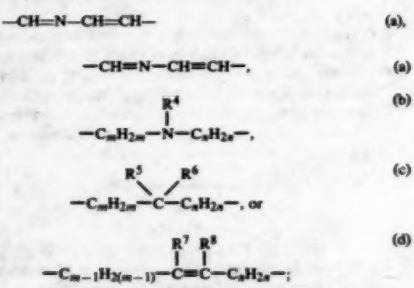
a pharmaceutically-acceptable acid-addition salt and/or a stereochemically isomeric form and/or a possible tautomeric form thereof,

wherein

R^1 is a member selected from the group consisting of hydrogen, halo, 1H-imidazol-1-yl, lower alkyloxy, aryloxy, aryllower alkyloxy, lower alkylthio, arylthio, hydroxy, mercapto, amino, lower alkylsulfinyl, lower alkylsulfonyl, cyano, lower alkyloxycarbonyl, lower alkylcarbonyl, and lower alkyl;

R^2 and R^3 are, each independently, members selected from the group consisting of hydrogen and lower alkyl, or R^2 and R^3 combined may form a bivalent radical of formula —CH=CH—CH=CH—;

A is a bivalent radical of formula:



wherein one of the hydrogen atoms within the radical C_mH_{2m}, $C_{m-1}H_{2(m-1)}$ or C_nH_{2n} may be replaced by lower alkyl or aryl;

m and n are, each independently, integers of from 1 to 4 inclusive, the sum of m and n being 3, 4 or 5;

R^4 is a member selected from the group consisting of hydrogen; lower alkyl; aryl; thiazolyl; pyrimidinyl; quinolinyl; lower alkylcarbonyl; lower alkyloxycarbonyl; aryllower alkyl; diaryllower alkyl; phenyl being substituted with arylcarbonyl; pyridinyl which may be substituted with cyano or lower alkyl; cyclohenyl and cyclohexenyl both of which may be substituted with up to two substituents independently selected from the group consisting of cyano and aryl;

R^5 is hydrogen; lower alkyl; aryl; hydroxy; lower alkyloxy; aryloxy; lower alkyloxy being substituted with morpholine, pyrrolidine or piperidine; amino; (lower alkyloxycarbonyl)amino; arylamino; (aryl)(lower alkyl)amino; (aryllower alkyl)amino; (aryllower alkenyl)amino; (aryllower alkenyl)(lower alkyl)amino; arylcarbonyloxy;

R^6 is hydrogen; aryl; lower alkyl; (lower alkylcarbonyl amino)lower alkyl, aryllower alkyl; arylcarbonyllower alkyl; aminocarbonyl; arylcarbonyl; arylaminocarbonyl; (aryllower alkyl)carbonyl, lower alkyloxycarbonyl; indolyl; or pyridinyl;

R^7 and R^8 are, each independently, members selected from the group consisting of hydrogen, lower alkyl, aryl, aryllower alkyl and pyridinyl;

wherein aryl is phenyl which may be substituted with up to 3 substituents, each independently selected from the group consisting of halo, lower alkyl, trifluoromethyl, nitro, amino, lower alkyloxy, hydroxy and lower alkyloxycarbonyl; thienyl; and naphthalenyl; lower alkyl comprises straight and branch chained saturated hydrocarbon radicals having from 1 to 6 carbon atoms; lower alkenyl comprises alkenyl radicals having from 2 to 6 carbon atoms.

4,956,352

TRICYCLO COMPOUNDS, A PROCESS FOR THEIR PRODUCTION AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Masakuni Okuhara; Hirokazu Tanaka; Toshio Goto, all of Ibaraki; Tohru Kino, Tsuchiura, and Hiroshi Hatanaka, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

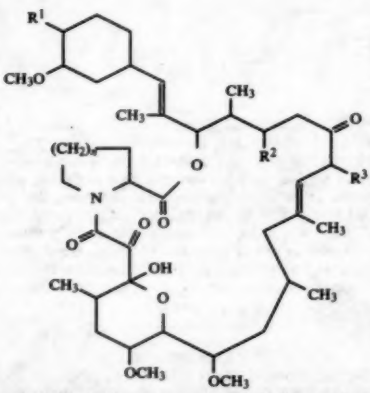
Division of Ser. No. 799,855, Nov. 20, 1985, Pat. No. 4,894,366. This application Aug. 17, 1989, Ser. No. 395,798

Claims priority, application United Kingdom, Dec. 3, 1984, 8430455; Feb. 5, 1985, 8502869; Apr. 1, 1985, 8508420

Int. Cl.[5] A61K *31/395, 31/695*

U.S. Cl. 514—63 **3 Claims**

1. A method for treating resistance to transplantation which comprises administering to a subject in need of treatment an effective amount of a compound of the formula



(I)

wherein R^1 is hydroxy or protected hydroxy selected from 1-(lower alkylthio)(lower)alkyloxy, tri(lower)-alkylsilyloxy, lower alkyl-diphenylsilyloxy, organic carboxylic acyloxy and organic sulfonic acyloxy,

R^2 is hydrogen, hydroxy or lower alkanoyloxy,

R^3 is methyl, ethyl, propyl or allyl,

n is an integer of 1 or 2, and

the symbol of a line and dotted line is a single bond or a double bond, provided that when R^1 and R^2 are each hydroxy, n is an integer of 2 and the symbol of a line and dotted line is a single bond, then R^3 is methyl, propyl and allyl, or a pharmaceutically acceptable basic salt thereof.

4,956,353

KOJIC ACID AND ESTERS AS INSECTICIDE SYNERGISTS

Patrick F. Dowd, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 16, 1988, Ser. No. 207,589

Int. Cl.[5] A01N *35/06, 37/18, 43/08, 43/16*

U.S. Cl. 514—65 **15 Claims**

9. A method for controlling Lepitopteran insects comprising applying to the habitat of said insects an insecticidally effective amount of a composition comprising: (1) an insecticide selected from the group consisting of pyrethrins, pyrethroids, and carbamates; (2) a synergistically effective amount of kojic acid or an ester of kojic acid, wherein the kojic acid or kojic acid ester is present in the range of about 25 to 250 ppm; and (3) an agronomically acceptable carrier.

4,956,354

THERAPEUTIC PREPARATION FOR USE ON SKIN

Gregoria Gutierrez, Ibague, Colombia, assignor to Thomas G. Kottke and Mary L. Kottke, both of Marrysville, Pa.

Filed Dec. 6, 1988, Ser. No. 280,384
Int. Cl.[5] A61K *31/635, 47/00*
U.S. Cl. 514—157 4 Claims

1. A therapeutic composition for treating burns and other skin injuries, consisting of;

almond oil, sulfathiazole, water and paraffin wax;

wherein the proportions of each of 4 fluid ounces of almond oil, 2 grams of sulfathiazole, 0.3 fluid ounces of water and 5 grams of paraffin wax.

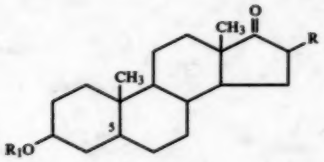
4,956,355

AGENTS FOR THE ARREST AND THERAPY OF RETROVIRAL INFECTIONS

Patrick T. Prendergast, Baybush, Ireland, assignor to Colthurst Limited, Baybush, Ireland

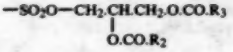
Continuation-in-part of Ser. No. 90,637, Aug. 27, 1987, abandoned. This application Apr. 15, 1988, Ser. No. 182,480
Claims priority, application Ireland, Apr. 16, 1987, 997/87; Aug. 27, 1987, 2289/87
Int. Cl.[5] A61K *31/56, 31/58, 31/665, 31/66*
U.S. Cl. 514—178 16 Claims

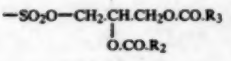
1. "A method for treating or arresting the progression of a retroviral infection in a patient in need of such treatment which comprises administering to said patent A". therapeutically effective amount of a compound of the formula (I).



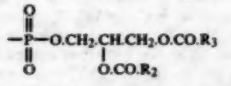
(I)

in which R is selected from the group consisting of a hydrogen atom and a bromine atom, and R_1 is a chemical group selected from the group consisting of a hydrogen atom, an SO_2OM group wherein M is selected from the group consisting of a hydrogen atom, a sodium atom, a sulphatide group

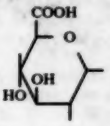




wherein each of R_2 and R_3, which may be the same or different, is selected from the group consisting of straight and branched chain alkyl radicals of 1 to 14 carbon atoms, a phosphatide group



wherein each of R_2 and R_3, which may be the same or different, is selected from the group consisting of straight and branched chain alkyl radicals of 1 to 14 carbon atoms, and a glucoronide group



wherein the broken line represents an optical double bond, and the hydrogen atom at position 5 is present in the α-or 62 - configuration or a mixture of both configurations.

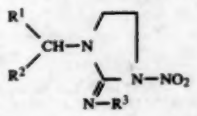
4,956,356

PESTICIDAL 3-SUBSTITUTED 1-NITRO-2-IMINO-1,3-DIAZACYCLOALKANES

Hans-Joachim Diehr, Wuppertal, and Benedikt Becker, Mettmann, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,645
Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818163
Int. Cl.[5] C07D *401/06;* A61K *31/44*
U.S. Cl. 514—341 7 Claims

1. A 3-substituted 1-nitro-2-imino-1,3-imidazolidine of the formula



in which

R^1 stands for pyridyl which group is optionally substituted by at least one of fluorine, chlorine, bromine, iodine, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by at least one of fluorine and chlorine), C_2–C_4-alkenyl (which is optionally substituted by at least one of fluorine and chlorine), C_2–C_4-alkinyl, C_1–C_4-alkoxy (which is optionally substituted by at least one of fluorine and chlorine), C_3–C_4-alkenyloxy (which is optionally substituted by at least one of fluorine and chlorine), C_3–C_4-alkinyloxy, C_1–C_4-alkylthio (which is optionally substituted by at least one of fluorine and chlorine), C_3–C_4-alkenylthio (which is optionally substituted by at least one of fluorine and chlorine), C_3–C_4-alkinylthio, C_1–C_4-alkylsulphinyl (which is optionally substituted by at least one of fluorine and chlorine), C_1–C_4-alkylsulphonyl (which is optionally substituted by at least one of fluorine and chlorine), amino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)-amino, phenyl, phenoxy, phenylthio, phenylamino, benzyl, formylamino, C_1–C_4-alkyl-carbonyl amino, formyl, carbamoyl, C_1–C_4-alkyl-carbonyl and C_1–C_4-alkoxy-carbonyl,

R^2 stands for hydrogen or C_1–C_3-alkyl and

R^3 stands for hydrogen or nitro.

4,956,357

BIOLOGICAL METHODS UTILIZING DIHYDROTESTOSTERONE HEPTANOATE

Bruce S. Keenan, 3639 Tartan, Houston, Tex. 77025, and James T. Sparrow, 12119 Atwell, Houston, Tex. 77035

Filed Mar. 28, 1986, Ser. No. 842,346
Claims priority, application United Kingdom, Mar. 30, 1984, 8508404
Int. Cl.[5] A61K *31/56*
U.S. Cl. 514—178 15 Claims

1. A method of treating gynecomastia comprising,

internally administering to a male patient a pharmacologically effective amount of dihydrotestosterone heptanoate.

4,956,358

TRICYCLIC CEPHAM COMPOUNDS AND USE

Akira Morimoto; Noriyoshi Noguchi, and Nobuo Choh, all of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

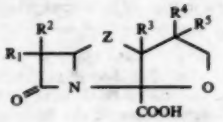
Filed Jul. 10, 1987, Ser. No. 72,144

Claims priority, application Japan, Jul. 15, 1986, 61-167283

Int. Cl.[5] C07D *501/20*; A61K *31/545*

U.S. Cl. 514—202 **16 Claims**

1. A compound of the formula



wherein R^1 represents an acylamino group wherein the acyl moiety is derived from a carboxylic acid and is an acyl group which is conventionally used as a substituent of the amino group at the 6-position of known penicillin derivatives or at the 7-position of cephalosporin derivatives; R^2 represents hydrogen, a methoxy group or a formylamino group; R^3, R^4 and R^5 independently represent hydrogen or an alkyl group; and Z represents a group represented by the formula —S—CH_2— or —CH_2—S—, its ester at the carboxyl group of the side chain at the 10-position or at the 2-carboxyl group, or its pharmacologically acceptable salt.

4,956,359

3-ARYLOXY AND 3-ARYLTHIOAZETIDINECARBOXAMIDES AS ANTICONVULSANTS AND ANTIEPILEPTICS

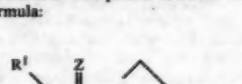
Chandler R. Taylor, Jr.; Albert D. Cale, Jr., both of Mechanicsville, and Harold F. Stauffer, Jr., Midlothian, all of Va., assignors to A. H. Robins Company, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 706,621, Feb. 28, 1985, abandoned. This application Oct. 22, 1986, Ser. No. 921,466

Int. Cl.[5] A61K *31/395*

U.S. Cl. 514—210 **94 Claims**

1. A method of treatment for anticonvulsant effect which comprises administering to a mammal in need thereof an effective amount of a 3-aryloxyazetidinecarboxamide or 3-arylthioazetidinecarboxamide compound selected from the group having the formula:



wherein:

Ar is selected from pyridyl in any of its positions optionally substituted by halo, from phenyl or phenyl substituted by 1 or 2 groups selected from chloro, bromo, iodo, fluoro, loweralkyl, loweralkoxy, nitro, aminocarbonyl, or trifluoromethyl;

B is oxygen or sulfur;

Z is oxygen or sulfur;

R^1 and R^2 may be the same or different and are selected from hydrogen, loweralkyl, aryl, allyl, substituted allyl, propargyl, cycloalkyl (3–9C), lower alkylcycloalkyl, cycloalkyloweralkyl, aryllowerallkyl, and diloweralkylaminoloweralkyl, and R^1 and R^2 when taken together with the adjacent nitrogen atom may form a heterocyclic amino group selected from azetidinyl, pyrrolidinyl, piperidinyl, homopiperidinyl, imidazolyl, piperazinyl, (halophenyl)-piperidin-yl, phenyl-1,2,3,6-tetrahydropyridin-1-yl, phenylpiperidin-1-yl, hydroxypiperidin-1-yl, 4-morpholino, 4-(3,5-diloweralkyl)morpholino, 1,2,3,6-tetrahydropyridin-1-yl, (halophenyl)(hydroxy)piperidin-1-yl, 4-(2,6-diloweralkyl)-morpholino, pyrrolo[1,2-a]pyrazin-2-yl, homopiperazinyl, 4-substituted piperazinyl, and 4-substituted homopiperazinyl;

R^3 is selected from hydrogen, loweralkyl, aryl or aryllowerallkyl; the geometrical isomers thereof, and the pharmaceutically acceptable acid addition salts thereof when R^1 and/or R^2 have one or more salt-forming basic amino components or when Ar is pyridyl, and the hydrates thereof, with the proviso that when R^3 is hydrogen, Z is oxygen, B is oxygen, and Ar is phenyl or phenyl substituted by trifluoromethyl, aminocarbonyl, dichloro, chloro, fluoro, bromo, or methyl, then R^1 and R^2 cannot be a combination of hydrogen and loweralkyl, or cannot both be hydrogen, methyl, or ethyl.

4,956,360

THIAZOLO (5,4-B)AZEPINE COMPOUNDS

Tetsuya Aono, Nagaokakyo; Masahiro Suno, Kobe, and Go Kito, Yao, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

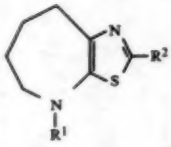
Filed Jul. 21, 1989, Ser. No. 383,071

Claims priority, application Japan, Jul. 22, 1988, 63-184220; Apr. 5, 1989, 1-086536

Int. Cl.[5] C07D *513/02*; A61K *31/55*

U.S. Cl. 514—215 **27 Claims**

1. A compound of the formula (I)



(I)

wherein R^1 is

(1) a hydrogen atom;

(2) a straight, branched or cyclic C_{1-6}alkyl or a straight or branched C_{2-6}alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from the group A consisting of hydroxy, C_{1-3} alkoxy, phenoxy, naphthoxy, phenyl-C_{1-2}-alkoxy, mercapto, C_{1-3} alkylthio, phenylthio, naphthylthio, phenyl-C_{1-2}-alkylthio, amino, mono or di-C_{1-3} alklyamino, halogen, C_{2-4} alkoxycarbonyl, benzyloxycarbonyl, C_{2-4} alkoxycarbonyloxy, formyl, C_{2-3} alkanoyl, benzoyl, C_{2-5} alkanoyyloxy, cyano, phthalimido, lower alkanoylamino, benzamido, C_{2-5} alkoxycarbonylamino, phenyl-loweralkoxycarbonylamino, pyrrolidino, morpholino, carboxyl, and carbamoyl;

(3) a group of the formula R3CO- wherein R3 is

(i) a straight, branched or cyclic C_{1-18} alkyl or a straight or branched C_{2-6} alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from the group A as defined above;

(ii) a phenyl or a naphthyl, each of which is unsubstituted or substituted by one to three substituents selected from the group P consisting of halogen, nitro, amino (which is unsubstituted or substituted by one or two substituents selected from C_{1-3} alkyl, C_{2-4} alkenyl, C_{3-8} cycloalkyl or phenyl), sulfo, mercapto, hydroxy, sulfoxy, sulfamoyl, C_{1-6} alkyl (which is unsubstituted or substituted by amino, di C_{1-3} alkylamino, mono C_{1-3} alkylamino, halogen, hydroxy, cyano or carboxy); C_{1-6} alkoxy (which is unsubstituted or substituted y a C_{1-3} alkylthio, benzyloxy, C_{1-3} alkylsulonamido, amidino which is unsubstituted or substituted by C_{1-3} alkyl or benzyl), methylenedioxy, alkoxy forminidoyl, C_{1-3} alkylsulfonyl, C_{1-3} alkylsulfonylamino, C_{2-4} alkoxycar-

bonyl, benzyloxycarbonyl, formyl, C_{2-3} alkanoyl, benzoyl, alkanoyloxy, cyano, phthalimido, alkanoylamino, benzamido, C_{2-4} alkoxycarbonylamino, phenyl lower alkoxycarbonylamino, pyrrolidino, morpholino, carboxy, carbamoyl and phenyl which is unsubstituted or substituted by a halogen or a methoxy-C_{1-3} alkyl; or

(iii) a 5- or 6-membered heterocyclic group B containing one to four heteroatoms selected from nitrogen, oxygen and sulfur atoms, or a condensed group D selected from indolyl, quinolyl, benzimidazolyl, imidazopyridyl and thiazolopyridyl, wherein the heterocyclic group B and the condensed group D are unsubstituted or substituted by one to three substituents selected from the group H consisting of amino (optionally having substituents selected from the C_{2-10} alkanoyl, benzoyl, halogen substituted C_{2-4} alkanoyl, phenyl and C_{1-3} alkyl), halogen, nitro, sulfo, cyano, hydroxy, carboxy, oxo, C_{1-10} alkyl (which may be substituted by phenyl, halogen, amino, hydroxy, carboxy, C_{1-3} alkoxy, C_{1-3} alkylsulfonyl and C_{1-3} dialkylamino), C_{1-6} cycloalkyl, C_{1-3} alkoxy, C_{2-10} alkanoyl, benzoyl, phenyl (which may be substituted by halogen, nitro, lower alkyl, lower alkoxy, amino, sulfo, hydroxy and cyano), oxo and C_{1-10} alkylthio (which may be substituted by phenyl, halogen, amino, hydroxy, carboxy, C_{1-3} alkoxy, C_{1-3} alkylsulfonyl and di-C_{1-3} alkylamino); or

(4) a C_{1-3} alkylsulfonyl which is unsubstituted or substituted by one to three substituents selected from the group A as defined above or a phenylsulfonyl which is unsubstituted or substituted by one to three substituents selected from the group P as defined above;

and R^2 is

(1) a hydrogen atom;

(2) a straight, branched or cyclic C_{1-6} alkyl which is unsubstituted or substituted by one to three substituents selected from the group A as defined above;

(3) a straight or branched C_{2-10} alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from

(i) the group A as defined above,

(ii) an oxo group;

(iii) a phenyl which is unsubstituted or substituted by one to three substituents selected from the group P as defined above, and

(iv) a heterocyclic group B or a condensed group D defined as above, each of which is unsubstituted or substituted by one to three substituents selected from the group H as defined above;

(4) a phenyl or a naphthyl, each of which is unsubstituted or substituted by one to three substituents selected from the group P as defined above; or

(5) a heterocyclic group B or a condensed group D defined as above, each of Which is unsubstituted or substituted by one to three substituents selected from the group H as defined above,

or a pharmaceutically acceptable salt thereof.

4,956,361

NEW COMBINATION PRODUCTS HAVING AN ANTIDEPRESSANT ACTION

Jorg Traber, Lohmar, and Harald Horstmann, Wuppertal, both of Fed. Rep. of Germany, assignors to Troponwerke GmbH & Co. KG, Cologne, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 197,066, May 19, 1988, abandoned. This application Jun. 23, 1989, Ser. No. 370,425

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1987, 3718398

Int. Cl.[5] A61K *31/55, 31/135, 31/435*

U.S. Cl. 514—217 **24 Claims**

1. A method of potentiating antidepressant activity in a patient which comprises administering to such patient an antidepressant composition comprising 5 to 100 parts by weight of nifedipine and 10 to 200 parts by weight of an antidepressant selected from the group consisting of imipramine, oxaprotiline, and desimipramine.

4,956,362

USE OF CARPIPRAMINE FOR THE TREATMENT OF ANXIETY AND SLEEP DISORDERS

Sylvie Goni, Paris; Odile Piot, Choisy le Roi, and Jean-Luc Zundel, Paris, all of France, assignors to Rhone-Poulenc Sante, a French Body Corporate, France

Filed Dec. 13, 1989, Ser. No. 450,084

Claims priority, application France, Dec. 16, 1988, 88 16606

Int. Cl.[5] A61K *31/54*

U.S. Cl. 514—217 **2 Claims**

1. Method of treating anxiety or a sleep disorder which comprises administering to a subject in need of such treatment an effective amount of carpipramine or a pharmaceutically acceptable salt thereof.

4,956,363

TREATMENT OF COGNITIVE AND BEHAVIORAL DISORDERS ASSOCIATED WITH AGING AND WITH DEMENTIA SYNDROMES

Ernst Wülfert; Jean Gobert, and Eric Cossement, all of Brussels, Belgium, assignors to U C B S.A., Brussels, Belgium

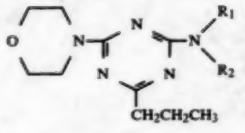
Filed Aug. 8, 1989, Ser. No. 309,877

Claims priority, application United Kingdom, Aug. 16, 1988, 8819494

Int. Cl.[5] A61K *31/535*

U.S. Cl. 514—232.2 **13 Claims**

1. A method for the treatment of cognitive and behavioral disorders associated with aging and with dementia syndromes in a patient in need thereof, which comprises administering to said patient an effective amount of a 2-amino-4-morpholino-6-propyl-1,3,5-triazine of the formula



(I)

wherein

R_1 represents a hydrogen atom, an alkyl, aralkyl or acetyl radical,

R_2 represents a hydrogen atom, a hydroxyl group. an alkyl hydroxyalkyl, alkoxyalkyl, dialkylamino, aryl-hydroxyalkyl, (hydroxy-cycloalkyl)alkyl, alkanoyloxyalkyl, benzoyloxyalkyl, phenylacetyloxyalkyl or aminocarbonyloxyalkyl radical, a COR_3 group, in which R_3 represents an alkyl, aryl, haloaryl, alkylaryl, alkoxyaryl, aralkyl or aryloxy radical, or a $CONR_4R_5$ group, in which R_4 and R_5 represent a hydrogen atom or an alkyl radical, or

R_1 and R_2, together with the nitrogen atom to which they are attached, represent an alkyleneimino radical substituted by a hydroxyalkyl radical, the alkyl, alkoxy and alkanoyloxy radicals having 1 to 4 carbon atoms and the cycloalkyl and alkyleneimino radicals having 4 to 6 carbon atoms,

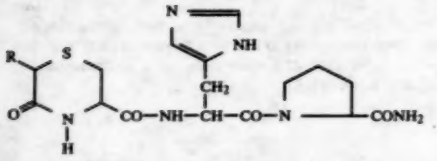
with the proviso that when R_1 represents the acetyl radical. R_2 represents an acetoxyalkyl radical, or of a non-toxic pharmaceutically acceptable acid addition salt thereof.

4,956,364
NOOTROPIC AGENT

Kiyoshi Kimura, Takatsuki; Yojiro Ukai, Kusatsu; Takashi Ogasawara, Uji, and Yutaka Nakagawa, Otsu, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

PCT No. PCT/JP88/00347, § 371 Date Dec. 6, 1988, § 102(e) Date Dec. 6, 1988, PCT Pub. No. WO88/07867, PCT Pub. Date Oct. 20, 1988
PCT Filed Apr. 7, 1988, Ser. No. 290,050
Int. Cl.[5] A61K *31/535*
U.S. Cl. 514—227.5 8 Claims

1. A method for effecting nootropic action in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula (I):



(I)

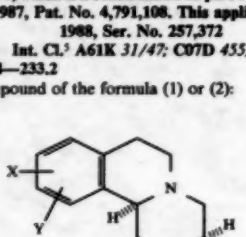
wherein R is lower alkyl, in combination with a pharmaceutically acceptable carrier.

4,956,365
DECAHYDRO-8H-ISOQUINO(2,1-G)(1,6)NAPHTHYRIDINE DERIVATIVES AND RELATED COMPOUNDS

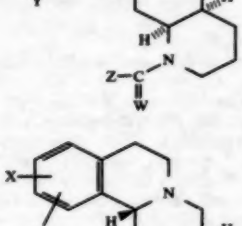
Robin D. Clark, Palo Alto, Calif.; Andrew T. Kilpatrick, Balerno, and Michael Spedding, Edinburgh, both of Scotland, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 174,750, Mar. 29, 1988, Pat. No. 4,886,798, which is a continuation-in-part of Ser. No. 37,320, Apr. 13, 1987, Pat. No. 4,791,108. This application Oct. 12, 1988, Ser. No. 257,372
Int. Cl.[5] A61K *31/47*; C07D *455/03*
U.S. Cl. 514—233.2 38 Claims

1. A compound of the formula (1) or (2):



(1)



(2)

in which:

X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms or halo, or X and Y when adjacent and taken together is methylenedioxy or ethylene-1,2 dioxy;

W is oxygen or sulfur; and

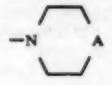
Z is $—R^1$, $—OR^2$ or $—NR^3R^4$, wherein

R^1 is lower alkyl of one to six carbon atoms, lower haloalkyl of the formula $V(CH_2)_n—$ in which V is bromo, chloro or fluoro and n is an integer of 1–6, cycloalkyl of 3–8 carbon atoms, heteroaryl, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms;

R^2 is lower alkyl of one to six carbon atoms, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms;

R^3 and R^4 are independently hydrogen, alkyl of one to eight carbon atoms, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms; or

R^3 and R^4 taken together with the nitrogen to which they are attached represent a heterocycle of the formula:



wherein A is $—(CH_2)_m—$, $—N(R^5)—$ or oxygen, in which m is an integer of 0–2 and R^5 is hydrogen or lower alkyl; with the proviso that for the compound of formula (2) where X is 2-methoxy, Y is 3-methoxy and W is oxygen Z cannot be methyl;

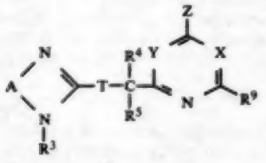
or a pharmaceutically acceptable salt thereof.

4,956,366
SUBSTITUTED THIENOIMIDAZOLE DERIVATIVES, A PROCESS FOR THE PREPARATION THEREOF, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM, AND THE USE THEREOF AS INHIBITORS OF GASTRIC ACID SECRETION, AS GASTROPROTECTIVES AND AS MEDICAMENTS FOR INTESTINAL INFLAMMATIONS

Hildegard Nimmesgern, Frankfurt am Main; Klaus Weidmann, Kronberg/Taunus; Hans-Jochen Lang; Robert Rippel, both of Hofheim am Taunus, and Andreas W. Herling, Bad Camberg, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

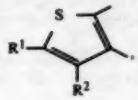
Filed Jul. 13, 1988, Ser. No. 218,386
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723327
Int. Cl.[5] C07D *403/12*; A61K *31/415*
U.S. Cl. 514—235.8 8 Claims

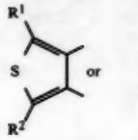
1. A compound of the formula I

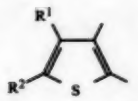


(I)

in which A represents







T denotes —S—, —SO— or —SO_2—,

R^1 and R^2 are identical or different and denote hydrogen, halogen, cyano, nitro, trifluoromethyl, (C_1–C_6)-alkyl, (C_1–C_6)-hydroxyalkyl, (C_1–C_6)-alkoxy, (C_1–C_4)-fluoroalkoxy, —O—CF_2Cl—, —O—CF_2-CHFCl, (C_1–C_6)-alkylmercapto, (C_1–C_6)-alkylsulfinyl, (C_1–C_6)-alkylsulfonyl, (C_1–C_6)-alkylcarbonyl, (C_1–C_6)-alkoxycarbonyl. carbamoyl, N-(C_1–C_4)-alkylcarbamoyl, N,N-di(C_1–C_4)-alkylcarbamoyl, (C_1–C_6)-alkylcarbonyloxy, (C_3–C_8)-cycloalkyl, phenyl, benzyl, phenoxy, benzyloxy, anilino, N-methylanilino, phenylmercapto, phenylsulfonyl, phenylsulfinyl, sulfamoyl, N-(C_1–C_4)-alkylsulamoyl or N,N-di-(C_1–C_4)-alkylsulfamoyl, or, if A is defined as above under (a) or (c), can also together denote —$(CH_2)_n$— or —CH=CH—CH=CH—, with one CH_2 group optionally being replaced by O, S, SO or SO_2,

R^3 denotes hydrogen, alkanoyl, (C_1–C_6)-alkylcarbamoyl or another physiologically tolerated protective group which can preferably be eliminated in an acid medium or under physiological conditions,

R^4 and R^5 are identical or different and denote hydrogen or (C_1–C_3)-alkyl,

X denotes nitrogen, and Y denotes CR^6, or

X denotes CR^6, and Y denotes nitrogen,

R^6 denotes hydrogen, halogen, (C_1–C_6)-alkyl, trifluoromethyl, (C_1–C_6)-alkoxy, —O—$C_pH(2p+1-q)F_q$, (C_1–C_6)-alkoxy-(C_1–C_6)-alkyl, (C_6–C_{12})-aryl, (C_6–C_{12})-aryl-(C_1–C_6)-alkoxy, thiophene, furan, pyrrole, imidazole, pyrazole, pyridine, tetrazole, pyrazine, pyrimidine, pyridazine, 1,2,4-triazole, thiazole, isothiazole, oxazole, isoxazole, benzothiophene, benzofuran, indole, inazole, benzimidazole, quinazoline, cinnoline, (C_1–C_6)-aryloxy, it being possible for the corresponding aryl moiety to be optionally substituted by halogen or trifluoromethyl, or denotes cyano, nitro, (C_1–C_6)-alkylamino, di-(C_1 –C_6)-alkylamino or amino,

Z denotes NR^7R^8, OR^{10} or SR^{10},

R^7 and R^8 are identical or different and denote hydrogen, (C_1–C_6)-alkyl, C_6–C_{12})-aryl, (C_7–C_{13})-aralkyl or (C_3–C_6)-cycloalkyl, or represent, together with the nitrogen to which they are bonded, azetidino, pyrrolidino, piperidino, piperazino, morpholino or N-(C_1–C_4)-alkylpiperazino, each of which is optionally substituted by one or two identical or different (C_1–C_6)-alkyl groups,

R^9 denotes hydrogen, halogen, (C_1–C_3)-alkyl, C_1–C_4)-alkoxy, benzyloxy or (C_1–C_7)-alkoxy-(C_1–C_3)-alkyl,

R^{10} denotes hydrogen, (C_1–C_4)-alkyl, (C_7–C_{13})-aralkyl, (C_6–C_{12})-aryl, vinyl, allyl or a substituted alkyl radical of the formula $C_pH(2p+1-q)F_q$,

n is 3 or 4,

p is 1, 2, 3 or 4, and

q is 1 to (2p+1), or its physiologically tolerated salt.

4,956,367

(a) **2-AMINO-4-MORPHOLINO-6-PROPYL-1,3,5-TRIAZINES**

Eric Cossement; Jean Gobert; Roland Boydens, and Jacques Mathieu, all of Brussels, Belgium, assignors to U C B S.A., Brussels, Belgium

Filed Aug. 8, 1989, Ser. No. 390,878

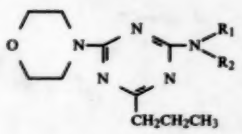
Claims priority, application United Kingdom, Aug. 16, 1988, 8819493

(b) **Int. Cl.**[5] **C07D** *413/14, 413/04;* **A61K** *31/53, 31/535*

U.S. Cl. 514—236.2 **12 Claims**

1. A 2-amino-4-morpholino-6-propyl-1,3,5-triazine, including its optionally active isomers and racemic mixtures of the formula

(c)



(I)

wherein

R_1 represents a hydrogen atom, an alkyl, phenylalkyl or acetyl radical,

R_2 represents a hydroxyl group, a hydroxyalkyl, alkoxyalkyl, dialkylamino, phenyl-hydroxyalkyl, (hydroxycycloalkyl)alkyl, alkanoyloxyalkyl, benzoyloxyalkyl, phenylacetyloxyalkyl or aminocarbonyloxyalkyl radical, a COR_3 group, in which R_3 represents an alkyl, phenyl, halophenyl, alkylphenyl, alkoxyphenyl, phenylalkyl or phenoxy radical, or a $CONR_4R_5$ group, in which R_4 and R_5 represent a hydrogen atom or alkyl radical, or,

R_1 and R_2, together with the nitrogen atom to which they are attached represent an alkyleneimino radical substituted by hydroxyalkyl radical, the above stated alkyl, alkoxy and alkanoyloxy radicals, either alone or as part of a more complex substituent, having 1 to 4 carbon atoms and the above stated cycloalkyl and alkyleneimino radicals having 4 to 6 carbon atoms, with the proviso that when R_1 represents the acetyl radical, R_2 represents an acetoxyalkyl radical, or a non-toxic pharmaceutically acceptable acid addition salt thereof.

11. A pharmaceutical composition comprising a therapeutically effective amount of a 2-amino-4-morpholino-6-propyl-1,3,5-triazine as claimed in claim **1** and a pharmaceutically acceptable solid or liquid diluent or carrier therefor.

4,956,368

METABOLITES AND PRODRUG FORMULATIONS OF 8-[4-[4-(1,2-BENZISOTHIAZOL-3-YL)-1-PIPERAZINYL]-BUTYL]-8-AZASPIRO[4.5]DECANE-7,9-DIONE

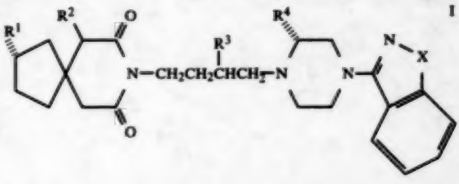
Joseph A. Cipollina, Middletown, Conn., and Edward H. Ruediger, Greenfield Park, Canada, assignors to Bristol-Myers Company, New York, N.Y.

Filed Jul. 24, 1989, Ser. No. 383,475

Int. Cl.[5] **A61K** *31/495;* **C07D** *401/14*

U.S. Cl. 514—254 **21 Claims**

1. A compound of Formula I



I

wherein

R^1 is selected from the gorup consisting of hydrogen, hydroxyl, lower (C_1–C_4) alkoxy, higher (C_9–C_{17}) acyloxy, and oxo;

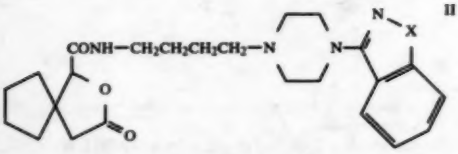
R^2 is selected from hydrogen, methyl, hydroxyl, lower (C_1–C_4) alkoxy, higher (C_9–C_{17}) acyloxy, and acetoxy;

R^3 is hydrogen, hydroxyl, and methoxy;

R^4 is hydrogen or oxo, with the proviso that R^1 and R^2 cannot be acyloxy simultaneously and further R^1, R^2, R^3, and R^4 cannot be hydrogen simultaneously; the solid and dotted lines refer to either a double covalent bond or a single covalent bond with another hydrogen atom covalently bonded to the carbon terminus end; and

X is S or SO, or a pharmaceutically acceptable salt or solvate thereof.

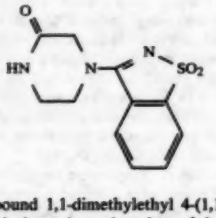
2. A compound of Formula II



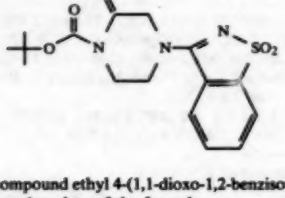
II

wherein X is selected from the gorup consisting of S, SO, and SO_2; or a pharmaceutically acceptable acid addition salt and solvate thereof.

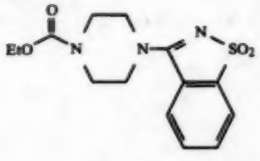
13. The compound 4-(1,2-benzisothiazol-1,1-dioxo-3yl)-2oxo-1H-piperazine of the formula



14. The compound 1,1-dimethylethyl 4-(1,1-dioxo-1,2-benzisothiazol-3-yl)-1-piperazinecarboxylate pf the formula



15. The compound ethyl 4-(1,1-dioxo-1,2-benzisothiazol3yl)-1-piperazinecarboxylate pf the formula



4,956,369

2-DITHIOALKYL-DIHYDROPYRIDINES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Marco Frigerio; Carmelo A. Gandolfi, and Sergio Tognella, all of Milan, Italy, assignors to Boehringer Biochemia Robin S.p.A., Milan, Italy

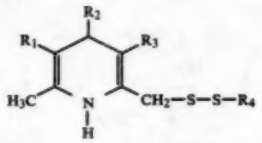
Continuation of Ser. No. 136,988, Dec. 23, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 333,815

Claims priority, application Italy, Dec. 24, 1986, 22881 A/86

Int. Cl.[5] C07D *401/12;* A61K *31/505*

U.S. Cl. 514—274 5 Claims

1. A compound of formula I wherein



(I)

R_1 is acetyl, benzoyl, cyano, nitro, a $COOR_5$ or a $CONR_6R_7$ group;

R_2 is selected from the group consisting of m-nitrophenyl, o-chlorophenyl, m-chlorophenyl, o-trifluoromethylphenyl, p-fluorophenyl, phenyl, o-methylthiophenyl, m-methylthiophenyl, pyridyl, and 2,3-dichlorophenyl;

R_3 is a $COOR_5$ group;

R_4 is selected from the groups C_1–C_{12} alkyl, C_2–C_6 alkenyl, C_2–C_5 alkynyl, phenyl heterocyclic moiety, phenyl-C_1–C_4-alkyl, or C_1–C_4-alkyl substituted by a heterocyclic moiety, said groups being optionally substituted by hydroxy; amino; monolalkylamino selected from the group consisting of ethylamino, isopropylamino and benzylamino; dialkylamino selected from the group consisting of dimethylamino, diethylamino, N-methyl-N-benzylamino, pyrrolidin-1-yl, piperidin-1-yl, piperazin-1-yl and morpholin-4-yl; C_1–C_4-alkoxy; C_2–C_6-acylamino; carboxy; C_1–C_4-alkoxy carbonyl; nitro; cyano; C_1–C_3-alkylthio; trifluoromethyl; and C_1–C_3-alkyl, said heterocyclic moiety being selected from the group consisting of:

(A) α-pyridyl; β-pyridyl; γ-pyridyl; tetrahydrofuryl; thienyl; α-pyridyl-N-oxide; 3-hydroxy-pyridyl; 2-pyrimidinyl; 4-pyrimidinyl; 1H-1,2,4-triazol-3-yl; 1H-1,2,4-triazol-5-yl; 2-thiazolyl; 1-methyl-tetrazol-5-yl; 2-methyl-1,3,4-triazol-5-yl; 5-amino-1,3,4-thiadiazol-2-yl; 2-amino-1,3,4-triazol-5-yl; 2-hydantoinyl; 2-imidazolinyl; 4-methyl-imidazol-2-yl; 1-phenyl-1H-tetrazol-5-yl;4,5-diphenyl-4-oxazolin-2-yl; 4-phenoxymethyl-5-carboxyimidazol-2-yl and esters thereof with C_1–C_4 alcohols; 1,4,5,6-tetrahydro-pyrimidin-2-yl; pyrimidin-2-yl unsubstituted or substituted with methyl, amino, o..o and/or carboxy groups in positions 4 or 6 of the pyrimidine ring; pyrimidin-6-yl; 2,6-diamino-pyrimidin-4-yl; tetrahydropyran-2-yl; (3,4,5-triacetoxy-6-acetoxymethyl)-tetrahydropyran-2-yl; 5-carboxyethoxy-4-oxo-pyrimidin-2-yl; 6-propyl-4-hydroxy-pyrimidin-2-yl; 6-propyl-4-amino-pyrimidin-2-yl;

(B) 4-(3H)-quinazolin-4-one-2-yl; 2-quinoazolinyl; 4-aminopyrazol pyrimidin-2-yl; 6-purinyl; 6,8-dihydroxy-2-purinyl; benzothiazol-2-yl; benzooxazol-2-yl; benzimidazol-2-yl unsubstituted or substituted in the benzene ring with alkoxy or halogen substituents; quinolyn-2-yl; and 7-trifluoromethylquinolin-4-yl;

R_5 is a C_1–C_6-alkyl chain, that may optionally be substituted by hydroxy; amino; monoalkylamino selected from the group consisting of methylamino, ethylamino, isopropylamino and benzylamino; dialkylamino selected from the group consisting of dimethylamino, diethylamino, N-methyl-N-benzylamino, pyrrolidin-1-yl, piperidin-1-yl, piperazin-1-yl and morpholin-4-yl; C_1–C_6-alkoxy; C_3–C_6-alkenyl; or phenyl;

R_6 and R_7, which are the same or different, are hydrogen, C_1–C_6-alkyl, benzyl or phenyl, its enantiomer, diastereoisomer, or a pharmaceutically acceptable salt thereof.

4,956,370

ANTIMYCOTICALLY ACTIVE SUBSTITUTED 2-AMINOTHIAZOLES

Joachim Ippen; Bernd Baasner; Albrecht Marhold, all of Leverkusen; Ernst Kysela, Bergisch-Gladbach; Klaus Schaller, Wuppertal, and Miklos von Bittera, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

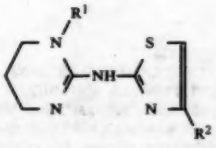
Filed Oct. 11, 1989, Ser. No. 419,981

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1988, 3836167; Nov. 25, 1988, 3839758

Int. Cl.[5] C07D *417/12*; A61K *31/505*

U.S. Cl. 514—275 **6 Claims**

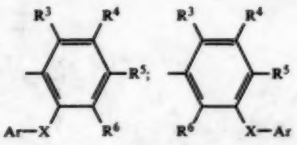
1. A 2-aminothiazole of the formula



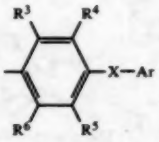
in which

R^1 represents hydrogen or straight-chain or branched alkyl having 1 to 4 carbon atoms and

R^2 represents a radical of the formula



or



where

R^3, R^4, R^5 and R^6 independently of one another in each case represent hydrogen, fluorine, chlorine, bromine, iodine, nitro, in each case straight-chain or branched alkyl, alkoxy, alkoxycarbonyl, dialkylamino, alkylthio, alkylsulphinyl or alkylsulphonyl each having 1 to 4 carbon atoms in the respective alkyl moieties, or in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenalkylthio, halogenoalkylsulphiyl or halogenoalkylsulphonyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms.

X represents oxygen, sulphur, sulphinyl or sulphonyl and

Ar represents phenyl, α-naphthyl, β-naphthyl, tetrahydronaphthyl or indanyl which are in each case unsubstituted or substituted by identical or different substituents, suitable substituents in each case being: fluorine, chlorine, bromine, iodine, in each case straight-chain or branched alkyl, alkoxy, alkoxy-carbonyl, dialkylamino, alkylthio, alkylsulphinyl or alkylsulphonyl each having 1 to 8 carbon atoms in the respective alkyl moieties, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, cycloalkyl having 3 to 7 carbon atoms, phenylalkyl or phenoxyalkyl each having 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and also phenyl or phenoxy.

4,956,371

SUBSTITUTED ISOQUINOLINES AND METHODS OF USING SAME

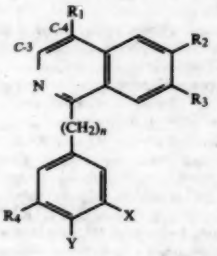
T. Scott Shoupe, Southbury, Conn.; Stephen M. Coutts, Rancho Santa Fe, Calif., and Lloyd J. Dolby, Eugene, Oreg., assignors to Euroceltique, S.A., Luxembourg, Luxembourg

Filed Sep. 19, 1989, Ser. No. 409,521

Int. Cl.[5] A01K *61/47*; C07D *401/12*

U.S. Cl. 514—307 **17 Claims**

1. A compound having the formula:



wherein

R_1 = H, OH, $-OCH_3$, $-\overset{O}{\overset{\|}{C}}-CH_3$, $-\overset{H}{\underset{|}{N}}-\overset{O}{\overset{\|}{C}}-CH_3$,

R_2 = H, $-CH_3$, $-O(CH_2)_m-Z$, $-(CH_2)_m-Z$, branched alkyl,

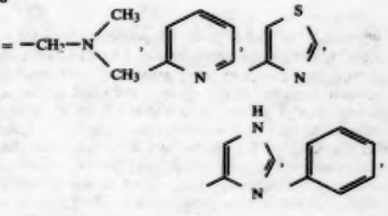
R_3 = H, $-CH_3$, $-O(CH_2)_m-Z$, $-(CH_2)_m-Z$, branched alkyl,

where:

at least one of R_2, R_3 is H

m = 1–3

and



R_4 = H, $-OCH_3$, Halogen

n = 0–5

X = H, $-OCH_3$, Halogen

Y = H, $-OCH_3$, Halogen

C_3–C_4 bond = saturated & unsaturated,

wherein at least one of R_2, R_3, R_4, X and Y is other than hydrogen.

4,956,372

CYCLIC ANTHRANILIC ACID DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Eisuke Kojima, Kogs; Shizuyoshi Fujimori, Ooaza-Marubayashi, and Katsuya Awano, Oyama, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

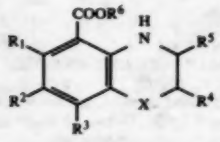
Filed Sep. 27, 1988, Ser. No. 249,996

Claims priority, application Japan, Oct. 2, 1987, 62-249608; Jan. 19, 1988, 63-8793

Int. Cl.[5] A61K *31/47*; C07D *215/00, 215/02*

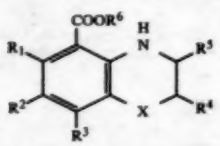
U.S. Cl. 514—311 **2 Claims**

1. Cyclic anthranilic acid derivative of the following formula (I),



wherein R^1 R^2 and R^3 each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, amino group, nitro group, hydroxy group, sulfonamide group, trifluoromethyl group, cyano group, carboxyl group, carbamoyl group, acetyl group, benzoylmethyl group which may be substituted by 1 to 3 substituents selected from the group consisting of halogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy and hydroxy, methylthio group, phenylethynyl group which may be substituted as defined above, ethynyl group which may be substituted as defined above, alkanoylamino group having 1 to 3 carbon atoms, benzoylamino group which may be substituted as defined above, alkylsulfonylamino group having 1 to 3 carbon atoms or phenylsulfonylamino group which may be substituted as defined above; R^4 and R^5 each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, cyano group, carboxyl group, hydroxymethyl group, phenyl group which may be substituted as defined above or benzyl group, provided that R^1 R^2, R^3, R^4 and R^5 are not simultaneously hydrogen; R^6 indicates a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms or benzyl group; X indicates a methylene group; the acid or alkali salts thereof.

2. An antirheumatoid and immunomodulatory pharmaceutical composition comprising a compound of the following formula (I),



wherein R^1 R^2 and R^3 each independently indicate a hydrogen atom, lower alkoxy group having 1 to 3 carbon atoms, amino group, nitro group, hydroxy group, sulonamide group, trifluoromethyl group, cyano group, carboxyl group, carbamoyl group, acetyl group, benzoylmethyl group which may be substituted by 1 to 3 substituents selected from halogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy and hydroxy, methylthio group, phenylethynyl group which may be substituted as defined above, ethynyl group which may be substituted as defined above, alkanoylamino group having 1 to 3 carbon atoms, benzoylamino group which may be substituted as defined above, alkylsulfonylamino group having 1 to 3 carbon atoms or phenylsulfonylamino group which may be substituted as defined above; R^4 and R^5 each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, cyano group, carboxyl group, hydroxymethyl group, phenyl group which may be substituted as defined above or benzyl group, provided that R^1, R^2, R^3, R^4 and R^5 are not simultaneously hydrogen; R^6 indicates a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms or benzyl group; X indicates a methylene group; the acid or alkali salts thereof; and an inert pharmaceutcally acceptable carrier.

4,956,373

PHARMACEUTICAL COMPOSITION COMPRISING 3-(N-PIPERIDINOMETHYL-AZINO) METHYLRIFAMYCIN S AS ACTIVE INGREDIENT

Giovanni Franceschi; Sergio Vioglio, both of Milan, and Roberto Biaschini, Bergamo, all of Italy, assignors to Farmitalia Carlo Erba S.R.L., Milan, Italy

Continuation-in-part of Ser. No. 304,033, Jan. 31, 1989, abandoned. This application May 18, 1989, Ser. No. 353,472

Int. Cl.[5] A61K *31/445*

U.S. Cl. 514—321 **1 Claim**

1. A method of treating a patient with a bacterial infection, comprising orally administering an antibacterial effective amount of 3-(N-piperidinomethylazino)methylrifamycin S to said patient.

4,956,374

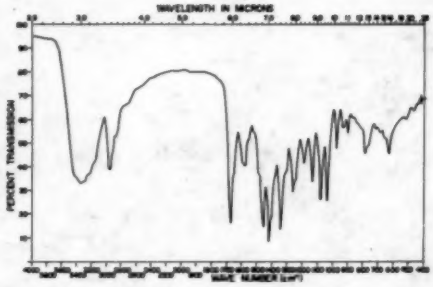
POLYSUBSTITUTED THIAZOLYLPYRIDINE CARBOXYAMIDE ANTIFUNGAL ANTIBIOTIC

Maki Nishio, Tokyo; Shigeyuki Ando, Mitaka; Takeo Miyaki, Yokohama; Masataka Konishi, Kawasaki, and Toshikazu Oki, Yokohama, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

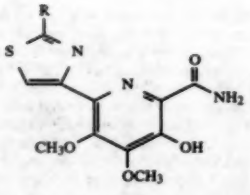
Filed Jul. 29, 1988, Ser. No. 226,016

Int. Cl.[5] C07D *417/04*; A01N *43/78*

U.S. Cl. 514—342 **8 Claims**



1. The compound having formula



wherein R is selected from the group consisting of
1, 4-dihydroxypentyl.
1,4-dihydroxy-4-methylpentyl,
1,5-dihydroxy-5,5-dimethylpentyl,
4-oxopentyl,
4-hydroxypentyl,
4-hydroxy-4-methylpentyl,
3-hydroxypentyl,
4-methyl-5-hydroxypentyl,
3-methyl-4-hydroxypentyl,
3-methyl-4-oxopentyl,

1-hydroxypentyl, and

5-hydroxy-5,5-dimethylpentyl.

5. A method for therapeutically treating an animal host affected by a fungal infection sensitive to compound as recited in claim 1 which comprises administering to said host an effective antifungal dose of said- compound.

4,956,375
N-INDANYL CARBOXAMIDE DERIVATIVE AND AGRICULTURAL/HORTICULTURAL FUNGICIDE CONTAINING THE DERIVATIVE AS ACTIVE INGREDIENT

Masatsugu Oda; Toshiro Sakaki, both of Yokohama; Naoko Sasaki, Tokyo; Hirofumi Tomita, Tokyo, and Nobuyuki Nonaka, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

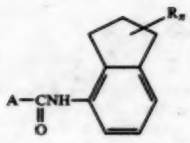
Division of Ser. No. 159,277, Feb. 23, 1988, Pat. No. 4,914,097. This application Nov. 29, 1989, Ser. No. 442,614

Claims priority, application Japan, Feb. 25, 1987, 62-42136; Apr. 16, 1987, 62-93799; Oct. 16, 1987, 62-261131; Oct. 16, 1987, 62-261132

Int. Cl.[5] **A01N** *43/74, 43/78, 43/82;* **C07D** *285/06*

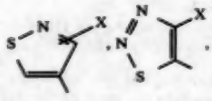
U.S. Cl. 514—361 **8 Claims**

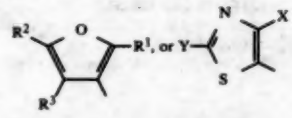
1. An N-indanyl carboxamide compound represented by the following formula (I):



(I)

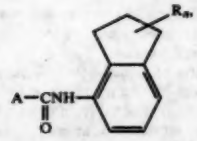
wherein A represents a group of the formula:





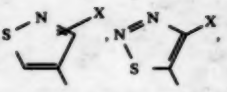
wherein X represents a halogen atom, a methyl group, or a trifluoromethyl group, Y represents a hydrogen atom, a halogen atom, a lower alkyl group, an amino group, a mercapto group, or a lower alkylthio group, R^1 represents a methyl group or a trifluoromethyl group, and R^2 and R^3 independently represents a hydrogen atom or a methyl group, R represents a lower alkyl group, and n is and integer of 1 to 6.

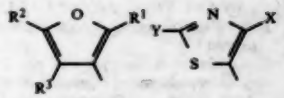
5. An agricultural/horizontal fungicidal composition, comprising as an active ingredient an effective amount of a N-indanyl carboxamide compound represented by the formula (I):



(I)

wherein A represents a group of the formula:





wherein X represents a halogen atom, a methyl group, or a trifluoromethyl group, Y represents a hydrogen atom, a halogen atom, a lower alkyl group, an amino group, a mercapto group, or a lower alkylthio group, R^1 represents a methyl group or a trifluoromethyl group, and R^2 and R^3 independently represents a hydrogen atom or a methyl group, R represents a lower alkyl group, and n represents an integer in the range of 1 to 6.

4,956,376
TETRAZOLE CARBOXYLIC ACIDS AND ESTERS AND INHIBITION OF BLOOD PLATELET AGGREGATION THEREWITH

Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Company, New York, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,559

Int. Cl.[5] **A61K** *31/41;* **C07D** *257/04*

U.S. Cl. 514—381 **10 Claims**

1. A compound of Formula I

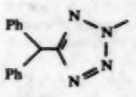
(I)

wherein

n is 6 to 9;

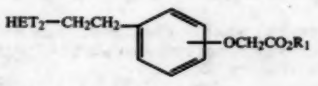
R is hydrogen or lower alkyl or an alkali metal ion; and

HET_1 is the heterocyclic radical



5-(diphenylmethyl)-2H-tetrazol-2-yl.

2. A compound of Formula II

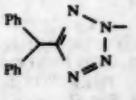


(II)

wherein

R_1 is hydrogen, lower alkyl or an alkali metal ion, and the radical $—OCH_2CO_2R_1$ is attached in the 3 or 4 ring position:

HET_2 is the heterocyclic radical



5-(diphenylmethyl)-2H-tetrazol-2-yl.

7. The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim 1.

9. The method for inhibiting blood platelet aggregation in

mammal which comprises administering a therapeutically effective amount of a compound of claim 2.

4,956,377

USE OF BUTYL-4-DIPHENYL-1,2-PYRAZOLIDINE-DIONE-3,5 AS AN ANTIVIRAL AGENT IN HUMANS AND ANIMALS

Jean-Olivier Miesch, 2, place Jeanne d'Arc, Rambouillet, France

Continuation-in-part of Ser. No. 344,523, Apr. 25, 1989, abandoned, which is a continuation of Ser. No. 33,821, Apr. 3, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 482,587

Int. Cl.[5] A61K *415*

U.S. Cl. 514—404 **6 Claims**

1. A method for treating a patient infected with human immuno deficiency virus comprising administering to said patient an effective amount of a composition consisting essentially of butyl-4-diphenyl-1, 2-pyrazolidine-dione-3,5.

4,956,378

4,5-DIHYDRO PYRAZOLE COMPOUNDS

Sidney C. Burford, and David N. Hardern, both of Loughborough, England, assignors to Fisons plc. Leicestershire, England

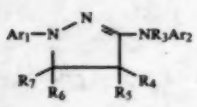
Division of Ser. No. 606,867, May 3, 1984, Pat. No. 4,824,859. This application Feb. 10, 1989, Ser. No. 286,268

Claims priority, application United Kingdom, May 21, 1983, 83/14111; Dec. 22, 1983, 83/34283

Int. Cl.[5] C07D *401/12, 231/06*; A61K *31/44, 31/415*

U.S. Cl. 514—404 **11 Claims**

1. A compound of formula



I

in which Ar_1 and Ar_2, which may be the same or different, each independently represent phenyl or pyridinyl, the phenyl or the pyridinyl each optionally being substituted by one or more of halogen; hydroxy; $COOR_{12}$; trihalomethyl; alkoxy C_{1-6}; alkyl C_{1-6}; $—NR_1R_2$; alkoxy C_{1-6} substituted by NR_1R_2 or by phenyl; or alkyl C_{1-6} substituted by NR_1R_2 or by $—COOR_{12}$;

R_1 and R_2, which may be the same or different, each independently represent hydrogen or alkyl C_{1-6},

R_3 represents hydrogen, alkyl C_{1-6}, alkanoyl C_{1-6}, or benzoyl,

R_4, R_5, R_6 and R_7, which may be the same or different each independently represent hydrogen, alkyl C_{1-6} or phenyl,

R_{11} represents alkyl C_{1-6} or phenyl,

R_{12} represents hydrogen or alkyl C_{1-6},

or a pharmaceutically acceptable acid addition salt, ester, amide, or prodrug thereof.

6. A composition for treating an inflammatory condition comprising an effective amount of a compound according to claim 1 in admixture with a pharmaceutically acceptable adjuvant, diluent or carrier.

4,956,379

PYRAZOLE CARBOXYLIC ACIDS AND ESTERS AND INHIBITION OF BLOOD PLATELET AGGREGATION THEREWITH

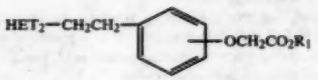
Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Company, New York, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,505

Int. Cl.[5] C07D *231/04*; A61K *31/41*

U.S. Cl. 514—406 **9 Claims**

1. A compound of Formula II



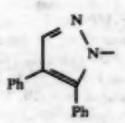
(II)

wherein

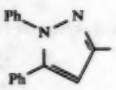
R_1 is hydrogen, lower alkyl or an alkali metal ion, and the radical $—OCH_2CO_2R_1$ is attached in the 3 or 4 ring position;

HET_2 is a heterocyclic radical selected from the group consisting of

(a) 3,4-diphenyl-1H-pyrazol-1-yl,



(b) 4,5-diphenyl-1H-pyrazol-1-yl, and



(c) 1,5-diphenyl-1H-pyrazol-3-yl.

8. The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim 1.

4,956,380

PROLINAL COMPOUNDS USEFUL IN TREATING AMNESIA

Masaaki Toda, Osaka; Shuichi Obuchida, Kyoto, and Hiroyuki Ohno, Shiga, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

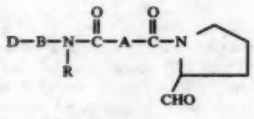
Filed Nov. 20, 1987, Ser. No. 123,410

Claims priority, application Japan, Nov. 20, 1986, 61-275375; Sep. 14, 1987, 62-228452

Int. Cl.[5] C07D *405/12*; A61K *31/40*

U.S. Cl. 514—422 **7 Claims**

1. A novel prolinal derivative of the formula:



wherein

A represents an alkylene group of from 1 to 8 carbon atoms(s) or alkenylene group of from 2 to 8 carbon atom(s) or a saturated hydrocarbon ring of from 3 to 7 carbon atoms, R represents hydrogen atom, phenyl group, benzyl group, alkyl group of from 1 to 8 carbon atom(s) or cycloalkyl group of from 3 to 7 carbon atoms,

B represents a single bond or an alkylene group of from 1 to 8 carbon atom(s) unsubstituted or substituted by a phenyl group or a benzyl group, or

D represents mono-, bi-, or tri-heterocyclic ring(s) containing not more than 15 ring members including carbon and one or more atom(s) selected from O and S which may be partially or fully saturated or aromatic, wherein said heterocyclic ring(s) represented by D are unsubstituted or substituted by from 1 to 3 of halogen atom, alkyl or alkoxy

group of from 1 to 4 carbon atom(s), nitro group or trifluoromethyl group.

4,956,381

TREATING TISSUE CALCIUM DEPLETION OR DEGENERATIVE PROCESSES IN BONE OR CARTILAGE

Pietro Bollinger, Bottmingen; Hans U. Gubler, Köniz, and Jörg Schnyder, Berne, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

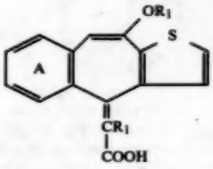
Filed Oct. 25, 1988, Ser. No. 262,420

Claims priority, application United Kingdom, Oct. 26, 1987, 8725009; Feb. 19, 1988, 8803908; Aug. 26, 1988, 8820347

Int. Cl.[5] A61K *31/38*

U.S. Cl. 514—443 **16 Claims**

1. A method of treating tissue calcium depletion or degenerative processes in bone or cartilage in a subject in need of said treatment, which comprises administering to said subject an effective amount for the treatment of tissue calcium depletion or degerative processes in bond or cartilage of a α-[b 10-oxy-4H-benzol[4,5]cyclohepta[1,2-b]thiophen-4-ylidene]-carboxylic acid of formula Ia

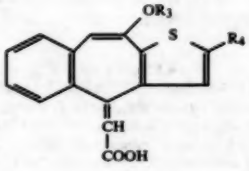


(Ia)

wherein:

R_1 is hydrogen or C_{1-2} alkyl; and ring A is unsubstituted or halo- or hydroxy-substituted;

or of formula Ib



(Ib)

wherein:

R_3 is C_{1-2} alkyl and

R_4 is halogen,

or a physiologically hydrolysable and acceptable ester or a pharmaceutically acceptable salt thereof.

4,956,382

SULFONAMIDE ANTI-ARRHYTHMIC AGENTS

John E. Arrowsmith, Deal; Peter E. Cross, Canterbury; Roger P. Dickinson, Dover, and Geoffrey N. Thomas, Sandwich, all of England, assignors to Pfizer Inc., New York, N.Y.

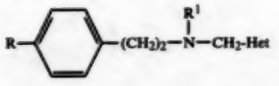
Filed Feb. 2, 1988, Ser. No. 151,390

Claims priority, application United Kingdom, Feb. 7, 1987, 8702789

Int. Cl.[5] A61K *31/34, 31/38*; C07D *307/78, 333/52*

U.S. Cl. 514—443 **8 Claims**

1. An organic compound of the formula:

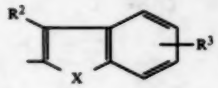


or a pharmaceutically acceptable salt thereof, wherein

R is —$NHSO_2$(C_1–C_4 alkyl);

R^1 is C_1–C_4 alkyl; and

"Het" is a benzo-fused heterocyclic group of the formula:



wherein R^2 is hydrogen, methyl or ethyl; R^3 is —$NHSO_2$(C_1–C_4 alkyl), and X is oxygen or sulfur.

8. A method for preventing or reducing cardiac arrhythmias in the treatment of a mammalian subject afflicted with an impaired cardiac pump function, which comprises administering to said subject an effective antiarrhythmic amount of a compound as claimed in claim 1.

4,956,383

ANTIFUNGAL TRIACETYLENIC DIOXOLONE FROM *MICROBISPORA SP.* SCC 1438, ATCC 53620

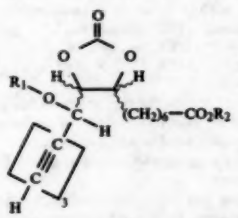
Mahesh G. Patel, Verona; Ann C. Horan, Summit; Joseph A. Marquez, Montclair, all of N.J., and J. Allan Waltz, Portola Valley, Calif., assignors to Schering Corporation, Kenilworth, N.J.

Filed Aug. 25, 1987, Ser. No. 89,278

Int. Cl.[5] A61K *31/365*; C07D *317/36, 317/38*

U.S. Cl. 514—467 **12 Claims**

1. A compound represented by the formula I



wherein R_1 is hydrogen or (C_2–C_8) alkanoyl and R_2 is hydrogen; lower alkyl or a pharmaceutically acceptable cation in racemic or optically active form.

4,956,384

1,4:3,6-DIANHYDROSORBITOL 2-MONONITRATE AND 5-MONONITRATE ESTERS AND PHARMACEUTICAL COMPOSITIONS THEREFROM

Paolo Chiesi, and Vittorino Servadio, both of Parma, Italy, assignors to Chiesi Farmaceutici S.p.A., Parma, Italy

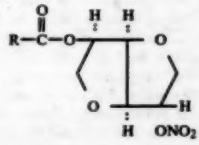
Filed May 4, 1988, Ser. No. 189,982

Claims priority, application Italy, May 8, 1987, 20438 A/87

Int. Cl.[5] A61K *31/34*; C07D *493/04*

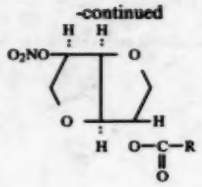
U.S. Cl. 514—470 **12 Claims**

1. 1,4:3,6-dianhydrosorbitol 2- or 5-mononitrate, of general formulae:



Ia

-continued



Ib

wherein R is:

a C_2–C_5 carboxyalkyl

a (C_1–C_4)-alkoxycarbonyl (C_1–C_5)-alkyl;

a 1,4:3,6-dianhydrosorbitol 2- (or 5)-nitrate-2 (or 5-)oxycarbonylethyl group;

a phenylethenyl group, which is unsubstituted or substituted on the aromatic ring by one or more lower alkoxy groups, at any positions.

9. A pharmaceutical composition containing as the active ingredient 1–15% of one of the compounds as claimed in claim 1 and appropriate pharmaceutically acceptable excipients, for the treatment of angina attacks, myocardial ischemia and cardiac insufficiency conditions.

4,956,385

METHOD FOR REDUCING THE DURATION OF THE COMMON COLD

George A. Eby, III, 2109 Paramount St., Austin, Tex. 78704

Continuation of Ser. No. 667,097, Nov. 1, 1984, abandoned, which is a continuation-in-part of Ser. No. 378,479, May 14, 1982, Pat. No. 4,503,070, which is a continuation-in-part of Ser. No. 288,750, Jul. 31, 1981, abandoned. This application Sep. 24, 1987, Ser. No. 102,750

Int. Cl.[5] A61K *9/10, 9/68, 31/315, 33/30*

U.S. Cl. 514—494 **32 Claims**

1. A method for treating the common cold comprising:

(a) applying an effective dosage of a pharmaceutically acceptable saliva soluble and ionizable zinc compound other than zinc gluconate to the oral mucosa of a human in need of treatment;

(b) permitting said zinc compound to remain in contact with the oral mucosa for a period of time necessary for the zinc thereof to saturate the oral mucosa; and

(c) applying additional dosages of such a zinc compound in like fashion until the cold has been treated.

4,956,386

PHARMACEUTICAL COMPOSITIONS AND PROCESS FOR THEIR PREPARATION

Christopher J. McLoughlin, Johannesburg, South Africa, and Ross B. Himstedt, Kenmore, Australia, assignors to Glaxo-Brocades N.V., Delft, Netherlands

Continuation of Ser. No. 143,797, Apr. 25, 1980, abandoned, which is a continuation of Ser. No. 592,636, Jul. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 543,862, Jan. 24, 1985, abandoned. This application Jul. 17, 1985, Ser. No. 756,555

Int. Cl.[5] A61K *31/29*

U.S. Cl. 514—503 **28 Claims**

1. Process for the preparation of a new solid, bismuth-containing pharmaceutical composition from an aqueous colloidal liquid composition, comprising at most 40% (w/v) of dissolved solids, at most 10% (w/v) bismuth citrate calculated as Bi_2O_3, ammonia in an amount at least sufficient to keep the bismuth salt in colloidal solution and at most 25% of a polyhydric alcohol selected from the group consisting of disaccharides, monosaccharides, hexitols and glycerol, said colloidal liquid composition having a pH between 8.5 and 11.3, which comprises spray drying said colloidal liquid composition to obtain a dry therapeutical active powder, capable of combining with water to form a bismuth containing therapeutically active colloidal solution.

4,956,387

SUBSTITUTED HYDRAZONES AND FUNGICIDES CONTAINING THESE COMPOUNDS

Bernd Wenderoth, Lampertheim; Siegbert Brand, Weinheim; Franz Schuetz, Ludwigshafen; Hubert Sauter, Mannheim; Eberhard Ammermann, Ludwigshafen, and Gisela Lorenz, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

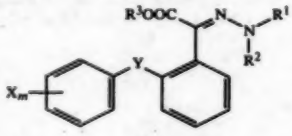
Filed Feb. 15, 1989, Ser. No. 310,651

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806874

Int. Cl.[5] A01N *37/00*

U.S. Cl. 514—522 **8 Claims**

1. Substituted hydrazones of the formula I



(I)

where

R^1, R^2 and R^3 are identical or different and each denotes hydrogen or alkyl of 1 to 5 carbon atoms,

X (m=1 to 5) is one or more identical or different substituents selected from the group consisting of halogen, cyano, trifluoromethyl, nitro, C_1–C_4-alkyl, C_1–C_4-alkoxy, phenyl, phenoxy, halophenoxy, C_1–C_4alkylphenoxy, benzyloxy, halobenzyloxy, C_1–C_4-alkylbenzyloxy, and hydrogen, and

Y is methyleneoxy, oxymethylene, ethylene, ethenylene, ethynylene, carboxymethylene, carbonylamino, methyleneamino or oxygen.

4,956,388

3-ARYLOXY-3-SUBSTITUTED PROPANAMINES

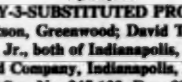
David W. Robertson, Greenwood; David T. Wong, and Joseph H. Krushinski, Jr., both of Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 945,122, Dec. 22, 1986, abandoned. This application Jan. 12, 1990, Ser. No. 462,925

Int. Cl.[5] A61K *31/135;* **C07C** *93/06*

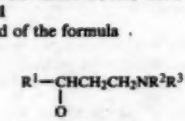
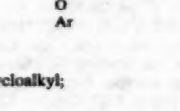
U.S. Cl. 514—651 **10 Claims**

1. A compound of the formula



wherein:

R^1 is C_3–C_7 cycloalkyl;

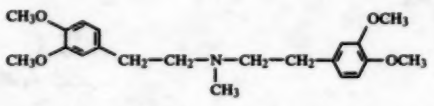
Ar is  or  ;

each of R^2 and R^3 independently is hydrogen or methyl;

each R^4 independently is halo, C_1–C_4 alkyl, C_1–C_3 alkoxy or trifluoromethyl;
each R^5 independently is halo, C_1–C_4 alkyl or trifluoromethyl;
m is 0, 1 or 2;
n is 0 or 1; and
the pharmaceutically acceptable acid addition salts thereof.

4,956,389
COMPOUNDS HAVING CALCIUM BLOCKING ACTIVITY
Giuseppe Quadro, Milan, Italy, and Jean Cahn, Montrouge, France, assignors to Yason S.R.L., Milan, Italy and SIR International S.A., Montrouge, France
Continuation of Ser. No. 512,170, Jul. 8, 1983, abandoned. This application Jan. 14, 1985, Ser. No. 691,157
Claims priority, application Italy, Jul. 9, 1982, 22339 A/82; Apr. 28, 1983, 20838 A/82
Int. Cl.[5] A61K *31/135*; C07C *87/28*
U.S. Cl. 514—654 1 Claim

1. The method of treatment of a condition consisting of cardiovascular diseases due to myocardial ischemia, disturbances in cerebral circulation due to cerebral oligoemia and calcium ions accumulation, which consists of administering to a living subject affected by said condition an effective amount of the compound N-methyl-N-bis-(3,4-dimethoxy-phenylethyl)amine of formula I



(I)

of melting point 67°–69° C. which forms a hydrochloride of melting point 182°–185° C., or an acid addition salt thereof with a pharmaceutically acceptable acid, and mixtures thereof in unit dosage form and inert excipients.

4,956,390
GAS TRANSPORT EMPLOYING PERFLUOROBUTYLDECALIN
Frank K. Schweighardt, Allentown, and Webb I. Bailey, Fogelsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.
Division of Ser. No. 89,475, Aug. 25, 1987, Pat. No. 4,777,304. This application Jun. 6, 1988, Ser. No. 203,356
Int. Cl.[5] A61K *31/025*; A01N *1/02*
U.S. Cl. 514—747 12 Claims

1. In a method of transporting gases in a fluid system, the improvement comprising using perfluorobutyldecalin as the gas transport agent for acid gases.

4,956,391
PROTECTED COMPLEX OF PROCAINE FOR THE TREATMENT OF SYMPTOMS FROM NARCOTICS ADDICTION, TINNITUS AND ALZHEIMER'S DISEASE
Alfred T. Sapse, Palm Bay Hotel, 780 N. E. 69th St., Apt. 7120, Miami Beach, Fla. 33138
Filed Aug. 17, 1988, Ser. No. 233,247
Int. Cl.[5] A61K *27/00*
U.S. Cl. 514—810 12 Claims

1. A composition for the treatment of individuals addicted to narcotics which comprises procaine and a complexing agent capable of forming a protected complex with procaine, in an amount effective to reduce the withdrawal symptoms of addicted individuals, said complexing agent comprising an acid selected from the group consisting of ascorbic acid, pantothenic acid, acetylsalicylic acid and amino acids.

4,956,392
PROCESS FOR PRODUCING METHANOL OR MIXED ALCOHOL
Yoshihiko Saito; Osamu Hashimoto; Masaaki Kuwa; Takashi Kojima, and Kinya Tsuji, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan
Continuation of Ser. No. 160,280, Feb. 25, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 437,314
Claims priority, application Japan, Feb. 27, 1987, 62-43021
Int. Cl.[5] C07C *27/06, 27/08*
U.S. Cl. 518—712 6 Claims

1. A process for producing methanol or a mixture of methanol and higher alcohols from a synthesis gas containing hydrogen and carbon monoxide and/or carbon dioxide, which comprises:
(a) passing the synthesis gas through a fluidized bed catalytic reactor at a superficial linear velocity of at least 0.2 m/sec., a temperature of 180° to 500° C. and a pressure of 50 to 150 atmospheres, said fluidized bed catalytic reactor containing a catalyst for use in the production of methanol or a mixture of methanol and higher alcohols, said catalyst comprising particles having an average particle diameter of 30 to 150 μm and a particle density of 1.7 to 3.3 g/cm^3, whereby methanol or a mixture of methanol and higher alcohols is produced in an exothermic reaction, and simultaneously with the reaction recovering heat from the reaction by passing a heat transfer medium through a heat transmission tube in said reactor,
(b) cooling the gas stream resulting from the reaction containing methanol or mixture of methanol and higher alcohols, thereby condensing the methanol or mixture of methanol and higher alcohols into a liquid, and
(c) separating the liquid methanol or mixture of methanol and higher alcohols from the gas stream.

4,956,393
STRUCTURES EXHIBITING IMPROVED TRANSMISSION OF ULTRAHIGH FREQUENCY ELECTROMAGNETIC RADIATION AND STRUCTURAL MATERIALS WHICH ALLOW THEIR CONSTRUCTION
Jack D. Boyd, Westminster; Hermann Sitt, Brea; Hong-Son Ryang, Camarillo, and Theodore F. Biermann, Mission Viejo, all of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany
Filed Aug. 29, 1988, Ser. No. 238,021
Int. Cl.[5] C08J *9/32*; C08G *73/12*; B27J *5/00*
U.S. Cl. 521—54 11 Claims

1. In a process for the manufacture or repair of radomes in which matrix resins, structural adhesives, and foams containing heat curable resin systems are utilized, the improvement comprising employing as said heat curable resin system, a resin system comprising, in weight percent relative to the total resin system weight,
(a) about 70 percent or more of a cyanate resin;
(b) from 0 to about 25 weight percent of a bismaleimide resin;
(c) from 0 to about 20 weight percent of an epoxy resin;
(d) from 0 to about 20 weight percent of an engineering thermoplastic selected from the group consisting of the polyimides, polyetherimides, and polyamideimides; and
(e) an effective amount of a cyanate cure promoting catalyst.

3. A syntactic foam having increased transparency to radar waves, comprising:
(a) from 90 to about 40 weight percent of a heat curable resin system component, comprising:
(i) about 70 weight percent or more of a heat curable cyanate resin; and
(ii) an amount of a catalyst effective to cure said cyanate resin;
and from 10 to about 60 weight percent of
(b) a microsphere component.

4,956,394

CLOSED CELL PHENOLIC FOAM CONTAINING ALKYL GLUCOSIDES

Edward W. Kifer, Trafford; Vincent J. Wojtyna, Butler; James P. Colton, Trafford, and Jeffrey T. Stickel, Pittsburgh, all of Pa., assignors to Thermal Products International, Pittsburgh, Pa.

Filed Dec. 12, 1989, Ser. No. 449,732
Int. Cl.[5] C08J 9/14
U.S. Cl. 521—84.1 23 Claims

1. An improved foamable phenolic resole composition of the type comprising aqueous phenol formaldehyde resole, surfactant, blowing agent, optional additives and anhydrous aryl sulfonic acid catalyst wherein the improvement comprises having from 2 to 12 percent by weight of the foamable phenolic resole composition of alkyl glucoside having an alkyl group of from 1 to 4 carbon atoms.

4,956,395

STYRENIC FOAM BLOWING AGENT COMPOSITION

Edward C. Leduc, Marietta, Ga., assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 18, 1990, Ser. No. 466,977
Int. Cl.[5] C08J 9/14
U.S. Cl. 521—79 9 Claims

1. A method of producing a styrene foam comprising: extruding and foaming a mixture of a styrene resin from the group consisting of polystyrene and copolymers of styrene with methyl methacrylate, acrylonitrile, maleic anhydride or acrylic acid, with a blowing agent comprising ethylchloride, propane and a halogenated ethane selected from the group consisting of 1,1,1-trifluoro-2-fluoroethane 1-chloro-1,1-difluoro-2,2,2-trifluoroethane, 1-chloro-1,1-difluoroethane and mixtures thereof wherein the blowing agent comprises about 0.5 to about 3.5 parts by weight propane per 100 parts by weight resin, about 2.5 to about 6.5 parts by weight ethyl chloride per 100 parts by weight resin and about 5.5 to about 12.0 parts by weight halogenated ethane per 100 parts by weight resin.

4,956,396

PROCESS FOR PREPARING RIGID POLYVINYL CHLORIDE STRACTURED FOAMS HAVING SUPERIOR SURFACE CHARACTERISTICS

Kwang-Ung Kim; Byoung-Chul Kim, and Soon-Man Hong, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea

Division of Ser. No. 277,894, Nov. 30, 1988, Pat. No. 4,886,837.
This application Mar. 6, 1989, Ser. No. 319,628
Claims priority, application Rep. of Korea, Dec. 9, 1987, 14012
Int. Cl.[5] C08J 9/06
U.S. Cl. 521—85 11 Claims

1. A process for producing a rigid polyvinyl chloride foam of a polyvinyl chloride resin which has a thick non-foamed layer and superior brightness, scratch resistance and impact resistance, which process comprises mixing 0.75 parts per hundred of resin of sodium bicarbonate as a chemical blowing agent and 0.5 parts per hundred of resin boric acid as a nucleating agent, 3–10 parts per hundred of resin of a polar plasticizer with a low molecular weight and 4–10 parts per hundred of resin of an impact resistance modifier with a raw polyvinyl chloride resin, and then extruding the mixture from a single-screw extruder to which a cylindrical die is attached.

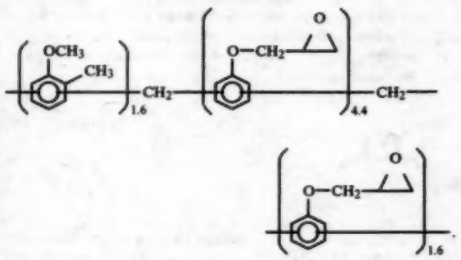
4,956,397

INSULATING LINER FOR SOLID ROCKET MOTOR CONTAINING VULCANIZABLE ELASTOMER AND A BOND PROMOTER WHICH IS A NOVOLAC EPOXY OR A RESOLE TREATED CELLULOSE

Gregory S. Rogowski, Richmond; Thomas F. Davidson, Manassas, and Timothy Ludlow, Sterling, all of Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 17, 1989, Ser. No. 381,541
Int. Cl.[5] C08K 3/40, 3/36, 3/22
U.S. Cl. 523—138 6 Claims

1. In an insulating liner for a solid rocket propellant motor comprising a vulcanizable elastomeric composition, about 5 to 25 parts vulcanizing agents per 100 parts elastomer, about 5 to 20 parts aramid polymer fiber per 100 parts elastomer and about 5 to 20 parts powder filler per 100 parts elastomer, the improvement which comprises about 10 to 25 parts per 100 parts elastomer of a bond promotor selected from the group consisting of celulosic fiber treated with a resorcinol-formaldehyde latex and a multifunctional aromatic epoxy resin having repeating groups of the formula



4,956,398

NITRILE RUBBER/VINYL CHLORIDE POLYMER/SILICA COMPOSITIONS

Abdul L. Ayub, Clearwater, and Herbert F. Schwarz, Sarnia, both of Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Jun. 7, 1989, Ser. No. 362,562
Int. Cl.[5] C08K 9/04, 3/36; C08L 27/06, 35/04
U.S. Cl. 523—209 6 Claims

1. A polymer composition comprising

(i) from 5 to 95 parts by weight of vinyl chloride resin, and correspondingly to 100 parts combined weight,

(ii) from 95 to 5 parts by weight nitrile rubber,

(iii) from 5 to 40 parts by weight of coated silica per 100 parts combined weight of said vinyl chloride resin plus said nitrile rubber,

characterized in that said coated silica is prepared by an aqueous emulsion polymerization process utilizing water and a non-ionic emulsifier, wherein said process consists of

(A) adding to a polymerization vessel:

(a) from 20 to 80 parts by weight of a polymerizable monomer composition comprising at least 80 weight percent acrylate monomer

(b) 100 parts by weight untreated silica, such that said silica is dispersed in said water,

(c) sufficient non-ionic emulsifier to emulsify said monomer composition,

(d) free radial initiator,

and

(B) polymerizing at least 50 weight percent of said monomer composition in the presence of said untreated silica.

4,956,399

EMULSIFIED MANNICH ACRYLAMIDE POLYMERS

Joseph J. Kozakiewicz, Trumbull, and Sun-Yi Huang, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 285,927, Dec. 19, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,730

Int. Cl.[5] C08K 7/16; D21H 17/00

U.S. Cl. 523—223 10 Claims

1. A composition comprising (alk)acrylamide-containing polymeric microparticles, said (alk)acrylamide polymer being substituted with at least about 1 mole percent of tertiary aminomethyl groups and having an average particle size of from about 200 to about 4000 Å in diameter, which aminomethyl groups continually self cross-link the polymer at ambient conditions.

4,956,400

MICROEMULSIFIED FUNCTIONALIZED POLYMERS

Joseph J. Kozakiewicz, Trumbull, and David L. Dauplaise, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 286,078, Dec. 19, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,704

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.[5] C08K 7/16; D21H 17/00

U.S. Cl. 523—223 8 Claims

1. In a water-soluble polymer-based polymer having functional groups which continually self cross-link said polymer at ambient conditions the improvement which comprises said polymer being in a form where substantially all of the polymer is present as discrete particles having diameters of between about 200 and about 4000 Å.

4,956,401

PIGMENTED LOW TEMPERATURE CURE EMULSION POLYMERS

Kenneth G. Hahn, Jr., Hinckley, and Barbara L. Kunz, Bay Village, both of, assignors to The Glidden Company, Cleveland, Ohio

Filed Oct. 15, 1987, Ser. No. 108,762

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.[5] C08J 3/08; C08L 61/00

U.S. Cl. 523—310 11 Claims

1. In a process for producing a pigmented paint composition based on polymeric binder comprising a functionally reactive emulsion polymer and a coreactive glycoluril derivative, the improvement comprising:

copolymerizing ethylenically unsaturated monomers in an aqueous polymerization medium and in the presence of surfactants and initiators, said ethylenically unsaturated monomers including carboxyl or hydroxyl functional monomers but excluding amino monomers to produce a functionally reactive emulsion polymer;

treating the functionally reactive emulsion polymer with an ion exchange resin to remove cations from the functionally reactive emulsion polymer to produce an ion-exchange emulsion polymer having a pH of less than 2.5;

combining said ion-exchanged emulsion polymer with a cation-free opacifying pigment having less than 0.5% by weight residual cation to form a pigmented paint composition.

4,956,402

SYNTHETIC RESIN WITH BASIC NITROGEN GROUPS FROM RESINS REACTED WITH THE KETIMINE-URETHANE PRODUCT OF AN ALKANOLAMINE, A KETONE AND ANISOCYANATE

Thomas Perner, Ludwigshafen; Rolf Osterloh, Erftstadt; Eberhard Schupp, Gruenstadt; Thomas Schwerzel, Ludwigshafen, and Klaas Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,499

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720956

Int. Cl.[5] C08G 59/14, 59/50; C08L 63/00

U.S. Cl. 523—415 7 Claims

1. A synthetic resin which carries basic nitrogen groups, is water-dilutable by protonation with an acid, and comprises the reaction product of:

(A) an epoxy resin having an average molecular weight M_n of from 300 to 6,000 and an average of from 1.5 to 3.0 epoxy groups per molecule; and

(B) a ketimine of a primary amide additionally containing one or more urethane groups, said component B having been prepared by reacting an aliphatic diisocyanate with a diol, or a monoalcohol, or a mixture thereof and with the ketimine of an aliphatic primary alkanolamine in an equivalent ratio of from 1:0.1 to 1.9:0.9 to 0.1.

4,956,403

SUPPRESSION OF PRESSURE WATER ABSORPTION OF LIGHTWEIGHT AGGREGATE BY AQUEOUS DISPERSION THEREIN OF ANIONIC POLYMERS

Toshio Yonezawa, Tokyo; Takashi Iwashimizu, Osaka; Yasuhiko Yoshioka; Koichi Ito, both of Tokyo; Kunio Sakase, and Tetsuo Nakase, both of Kyoto, all of Japan, assignors to Takenaka Komuten Co., Ltd., Osaka and Sanyo Chemical Industries, Ltd., Kyoto, both of, Japan

Filed Nov. 2, 1987, Ser. No. 122,134

Claims priority, application Japan, Nov. 7, 1986, 61-265275

Int. Cl.[5] C08K 3/00

U.S. Cl. 524—5 7 Claims

1. A lightweight aggregate which is inhibited for water absorption by pressure, the aggregate being treated with an aqueous polymer dispersion having a viscosity permitting the dispersion to enter fine pores in a surface layer of said aggregate by absorption, the dispersion so entered in the pores being thickenable by rise of pH and when so thickened having a viscosity of not less than 50 times the viscosity before thickening.

4,956,404

PLASTIC COMPOSITION FOR TOYS, NOVELTY ITEMS AND ARTS AND CRAFTS

Josef Pelzig, 16011 Hart St., Van Nuys, Calif. 91406

Filed Jan. 10, 1989, Ser. No. 295,351

Int. Cl.[5] C08L 3/02

U.S. Cl. 524—48 23 Claims

1. A semi-solid plastic composition that is elastic and pliable and which remains flexible and does not become brittle after exposure to air and which retains fine detail of surface impressions without flow-back, consisting essentially of:

(a) a dextrin incompatible polyvinyl acetate homopolymer emulsion in an amount from about 50 to about 95 wt.%, which coagulates in the presence of dextrin with the resulting coagulum incorporating all of the water of the emulsion to form a semi-solid plastic composition;

(b) glyceryl triester in an amount from about 1 to about 6 wt.%;

(c) epoxidized oil in an amount from about 0.5 to about 3.0 wt.%;

(d) fumed silica in an amount from about 1 to about 6 wt.%;

(e) hydrogenated starch hydrolysate in an amount from about 0.5 to about 3.0 wt.%; and
(f) dextrin in an amount from about 1 about 4 wt.%.

4,956,405

OZONE RESISTANT ELASTOMERIC ARTICLES

Edward L. Wheeler, Watertown, and Robert J. Franko, Beacon Falls, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

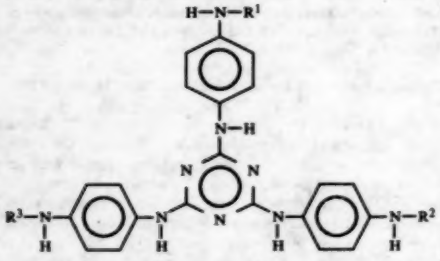
Division of Ser. No. 163,924, Mar. 4, 1988, Pat. No. 4,794,134, which is a continuation-in-part of Ser. No. 90,298, Aug. 28, 1987, Pat. No. 4,794,135. This application Oct. 5, 1988, Ser. No. 254,006

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.[5] **C08K** *5/3492;* **B32B** *9/04, 9/06, 25/06*

U.S. Cl. 524—100 **10 Claims**

1. A rubber article having an elastomeric body having an outermost layer comprising:
(a) at least one ozone degradation-prone highly unsaturated polymer; and
(b) a compound of structure (I), added in an amount effective to protect said unsaturated polymer against ozone attack,



(I)

in which R^1, R^2, R^3 are radicals independently selected from a C_3–C_{18} branched or linear alkyl, or a C_3–C_{12} cycloalkyl or a C_3–C_{12} cycloalkyl substituted with one or more C_1–C_{12} alkyl groups.

4,956,406

BIS-CYCLIC PHOSPHITE COMPOUNDS AND POLYMERIC MATERIALS STABILIZED THEREWITH

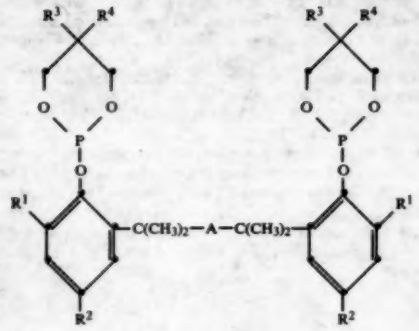
Garry L. Myers, and Richard H. S. Wang, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 3, 1989, Ser. No. 389,240

Int. Cl.[5] **C08K** *5/524, 5/526*

U.S. Cl. 524—119 **12 Claims**

1. A compound having the formula



wherein
each R^1 is independently selected from hydrogen, alkyl, aralkyl, aryl, carboxy, alkoxycarbonyl or halogen;
each R^2 is independently selected from hydrogen, alkyl, aralkyl, alkoxy, aryl, carboxy, alkoxycarbonyl or halogen;
each R^3 and R^4 is alkyl; and
A is 1,3- or 1,4-phenylene.

4,956,407

POLYMER COMPOSITION

Kazushige Funasaki; Kenji Tajima; Toshinori Yukino, and Hiroshi Yamanoi, all of Urawa, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

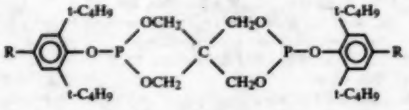
Continuation of Ser. No. 175,309, Mar. 30, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,362

Claims priority, application Japan, Apr. 10, 1987, 62-87992; Apr. 24, 1987, 62-101464

Int. Cl.[5] **C07F** *9/15;* **C08K** *5/524*

U.S. Cl. 524—120 **3 Claims**

1. A polymer composition which comprises
(A) a polymer blend comprising (a-1) a polyester and (a-2) a polycarbonate or
(B) a polymer blend comprising (b-1)α-methylstyrene-modified ABS resin and (b-2) at least one polymer selected from a polycarbonate, a saturated polyester, polyphenylene ether, a polyamide and a polyacetal and
(C) an organic phosphite compound having the formula (I):



(I)

in which R is an alkyl having 1 to 9 carbon atoms, said polymer composition comprising 100 parts by weight of (A) or (B) and 0.001 to 10 parts by weight of (C).

4,956,408

COMPLEX ACRYLATES AS STABILIZER FOR CONJUGATED DIENE/MONOVINYL AROMATIC COPOLYMERS

Ronald D. Mathis; Alonzo G. Kitchen, and Frank J. Szalla, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 13, 1988, Ser. No. 220,105

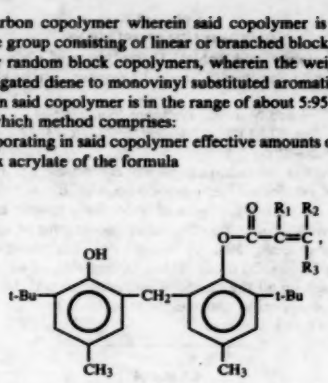
Int. Cl.[5] **C08K** *5/36*

U.S. Cl. 524—147 **22 Claims**

1. A method for stabilizing a polymeric composition comprising a conjugated diene/monovinyl substituted aromatic

hydrocarbon copolymer wherein said copolymer is selected from the group consisting of linear or branched block, tapered block or random block copolymers, wherein the weight ratio of conjugated diene to monovinyl substituted aromatic hydrocarbon in said copolymer is in the range of about 5:95 to about 50:50, which method comprises:

incorporating in said copolymer effective amounts of a complex acrylate of the formula



wherein t-Bu is a

group;

and R_1, R_2 and R_3 are the same or different and are selected from the group consisting of hydrogen, alkyl residues having from 1 to 16 carbon atoms, aryl residues, cycloalkyl residues having from 5 to 9 carbon atoms, and alkyl substituted aryl residues having from 7 to 12 carbon atoms; and

an organic phosphite of the formula

$(RO)_3P$; and

a non-acrylate substituted hindered phenolic compound.

4,956,409

BINDER CHEMISTRY

Ronald F. Sieloff, Pataskala, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 8,067, Jan. 13, 1987, abandoned, which is a continuation of Ser. No. 770,005, Aug. 27, 1985, abandoned, which is a continuation of Ser. No. 616,343, Jun. 1, 1984, abandoned. This application Jul. 26, 1988, Ser. No. 225,566

Int. Cl.[5] C08J 5/21

U.S. Cl. 524—211 **6 Claims**

1. A method of applying an aqueous foamed binder system to a glass fiber pack which already contains enough binder to hold the glass fiber pack together which comprises including in the aqueous foamed binder system a heat-decomposable surfactant, applying the aqueous foamed binder to the pack and heating the pack and binder system to decompose the surfactant and produce a hydrophobic surface layer on the pack.

2. A method of forming a fibrous glass product comprising combining in an aqueous medium a phenolic resole, urea, a silane or hydrolysis product thereof and a decomposable surfactant so as to form a phenolic resole binder, foaming said phenolic resole binder and applying said foamed resole binder to a wool pack which already contains a binder; molding and curing said wool pack to a final product and wherein said surfactant decomposes during molding and curing to leave a hydrophobic surface on said product.

4,956,410

BOUND ANTIOXIDANT MASTERBATCHES

Gerald Scott, 20 Gaia Lane, Lichfield, Staffordshire, England WD13 7LW; Sahar Al-Malaika, 55 Monmouth Drive, Sutton Coldfield, England B73 6JH, and Abdul Ibrahim, c/o The University of Birmingham, Aston Triangle, Birmingham, England B4 7ET

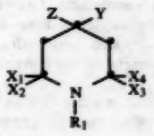
Continuation of Ser. No. 170,961, Mar. 18, 1988, abandoned. This application Jul. 7, 1989, Ser. No. 377,753

Claims priority, application United Kingdom, Mar. 19, 1987, 8706569

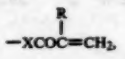
Int. Cl.[5] C08F 285/00, 255/02; C08L 51/06

U.S. Cl. 525—73 **11 Claims**

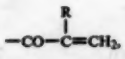
1. A process for preparing a bound antioxidant polymer masterbatch concentrate which comprises grafting at least one antioxidant selected from bis-acrylic esters, bis-alkylacrylic esters, bis-acrylic amides, and bis-alkylacrylic amides having the structure



where Y represents



R_1 represents



Z represents H, OR, NHR, NR_2, COOH or CH_2COOH, each R, which can be the same or different, represents H or alkyl, X represents —O— or —NH—, and each of X_1, X_2, X_3 and X_4, which can be the same or different, represents alkyl, onto a polymer selected from the group consisting of polyolefins, vinyl chloride polymers, polystyrene, polyamides, ethylene-propylene copolymers and terpolymers, rubber-modified plastics, thermoplastic rubbers and polyunsaturated rubbers, in an amount sufficient to provide from 2 to 50 grams of anitoxidant per 100 g of bound antioxidant polymer masterbatch concentrate by reaction in the melt in the presence of free radicals at a temperature of 100° C. to 350° C., said free radicals being produced by shearing and/or by the presence of a radical generator in a molar ratio of said radical generator to said antioxidant of from 0.001:1 to 1:1, the reaction being continued whilst continuing to shear the melt for a time such that the melt viscosity of the polymer which increases initially during the reaction has reduced to a level which permits the concentrate to be homogeneously blended subsequently into unstabilised polymer.

4,956,411

EPOXY RESIN COMPOSITION FOR COMPOSITE MATERIAL FROM M- OR O-SUBSTITUTED TRIGLYCIDYLAMINOPHENOLS, DIAMINODIPHENYLSULFONE AND LATENT CURING AGENTS

Hisashi Tada; Yoshinobu Shiraishi, and Shigetsugu Hayashi, all of Nagoya, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,274

Claims priority, application Japan, Feb. 5, 1988, 63-25204; Feb. 5, 1988, 63-25205; Feb. 5, 1988, 63-25206

Int. Cl.[5] C08G *59/46, 59/56, 59/60*

U.S. Cl. 528—93 **4 Claims**

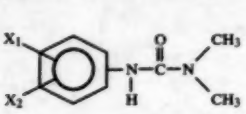
1. An epoxy resin composition for composite materials, comprising:

(A) an epoxy compound containing 10 to 100% by weight of m- or o-methyl-p-N,N-diglycidyl-aminophenylglycidylether or its oligomer,

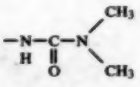
(B) a diaminodiphenylsulfone and/or a diaminodiphenylmethane in an amount of 50 to 200% for the total epoxy equivalent of the epoxy compound,

(C) 1 to 10 parts by weight of at least one compound selected from the group consisting of dicyandiamide, 2,6-xylenylbiguanide, o-tolylbiguanide, diphenylguanidine, adipyl dihydrazide, azelayl dihydrazide, and isophthalic acid dihydrazide for 100 parts by weight of the epoxy compound, and

(D) 1.5 to 15 parts by weight of one or more of urea compounds represented by the following general formula:



wherein X_1 and X_2, which may be the same or different, each represents —Cl, —Br, $—NO_2$, $—CH_3$, —H, —OCH3, $—C_2H_5$, or



for 100 parts by weight of the epoxy compound.

4,956,412

POLYMER BLEND

William P. Gergen, Houston, Tex.; Robert G. Lutz, Santa Rosa, Calif., and William W.C. Hart, Avon, Conn., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 9, 1988, Ser. No. 269,033

Int. Cl.[5] C08L *73/00, 35/06*

U.S. Cl. 525—190 **9 Claims**

1. A composition comprising a non-miscible blend of:

a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the linear alternating polymer is represented by the formula

$$—CO—CH_2—CH_2—_x—CO—B—_y—$$

wherein B is the moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms and the ratio of y:x is no more than about 0.5; and

a copolymer of a vinyl aromatic monomer and an α,β-ethylenically unsaturated alkenyl nitrile, the alkenyl nitrile being present in an amount less than about 40% by weight of the copolymer, which is present in an amount between 0.5% and 35% by weight of the composition.

4,956,413

RUBBER COMPOSITIONS

Yoshio Tanimoto, and Kohichi Iketani, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 20, 1989, Ser. No. 325,534

Int. Cl.[5] C08L *9/00, 23/16, 23/26, 23/32*

U.S. Cl. 525—192 **6 Claims**

1. A rubber composition which comprises 100 parts by weight of ethylene-α-olefin-non-conjugated diene copolymer rubber, 5–40 parts by weight of solid diene rubber and 4–10 parts by weight of sulfur, the butadiene content of said solid diene rubber being 50% by weight or more, the butadiene portions of said solid diene rubber having 40% or more of 1,2 bonds based on all the bonds of said portion, and the ratio of weight-average molecular weight to number-average molecular weight being 2 or less.

4,956,414

PREPARATION OF IONICALLY CROSSLINKED ETHYLENE COPOLYMERS, IONICALLY CROSSLINKED ETHYLENE COPOLYMERS AND THEIR USE AS FILMS, CABLE SHEATHING AND ADHESION PROMOTERS

Thomas Muehlenbernd, Heidelberg, and Norbert Haseubein, Dirmstein, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 363,785

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3822067

Int. Cl.[5] C08G *81/02*

U.S. Cl. 525—196 **5 Claims**

1. A process for the preparation of an ionically crosslinked ethylene copolymer [A] by neutralizing the corresponding ethylene copolymer [B] which contains, as copolymerized units, from 0.1 to 20 mol % of α,β-ethylenically unsaturated carboxylic acids or α,β-ethylenically unsaturated comonomers which donate carboxyl groups, with the addition of a metal salt to a feed zone of an extruder, wherein the neutralization is carried out in the absence of a solvent in an extruder of an ethylene high pressure polymerization system, and the metal salt added is a metal salt of carboxyl-containing ethylene copolymer, ethylene graft copolymer or ethylene terpolymer [C].

4,956,415

PREPARATION OF TRIBLOCK COPOLYMERS

Kent S. Dennis, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 318,788, Mar. 3, 1989, Pat. No. 4,885,343, which is a continuation of Ser. No. 33,444, Apr. 1, 1987, Pat. No. 4,839,430. This application Nov. 7, 1989, Ser. No. 433,649

Int. Cl.[5] C08L *293/00, 297/04, 297/02*

U.S. Cl. 525—280 **12 Claims**

1. A method for the preparation of block copolymer of the ABA configuration, the steps of the method comprising:

(a) providing a first anionically polymerizable monomer portion used in polymerizing the A block polymer chains, which first monomer portion has at least one monomer selected from the group consisting of styrene, α-methylstyrene, m-ethylstyrene, p-methoxy-α-methylstyrene, p-ethyl-α-methylstyrene, p-ethyl-α-ethylstyrene, 2,4-diethylstyrene, m-isopropylstyrene, butadiene, dimethylbutadiene, isoprene, piperylene, mono- or diortho-, and halo-substituted styrenes;

(b) anionically polymerizing the first monomer portion to provide A block polymer chains having living ends;

(c) contacting the A block polymer chains with a second anionically polymerizable monomer portion used in polymerizing the B block polymer chain, which second monomer portion has at least one monomer selected from the group consisting of α-methylstyrene, p-methoxy-α-methylstyrene, p-ethyl-α-methylstyrene, p-ethyl-α-ethylsty-

rene, or combinations thereof, provided that at least one monomer selected from the second monomer portion is different from at least one monomer selected from the first monomer portion;

(d) anionically polymerizing the second monomer portion in the presence of the A block polymer chains to form A-B block polymer chains having living ends;

(e) contacting said A-B block polymer chains with up to at least a quantity sufficient to react with a substantial proportion of said polymer chain living ends of an α-alkylstyrene or a ring-alkyl substituted α-alkylstyrene, wherein the α-alkyl groups contain between about 1 to about 20 carbon atoms, and the ring-alkyl groups have at least 2 carbon atoms; and

(f) coupling the A-B block polymer chains with a difunctional coupling agent to bring about substantial coupling.

4,956,416

AMINO OR HYDRAZINO PEROXIDES, DERIVATIVES AND THEIR USES

Jose Sanchez, Grand Island, N.Y., assignor to Atochem North America, Inc., Philadelphia, Pa.

Filed Aug. 18, 1988, Ser. No. 233,643

Int. Cl.[3] C08F *8/30, 8/34*; C07C *109/10*; C07D *209/56*

U.S. Cl. 525—327.6 **2 Claims**

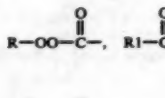
1. A compound of Structure A:

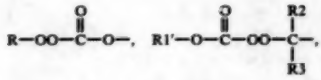
$$(P—R11—X—(—NH—)_x—R22—)_y—Q]_zA$$

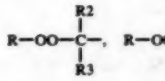
where x is 0 or 1, y is 1 or 2 and z is 1 to 3, with the further provisos that when y is 2, z can only be 1 and when z is 2 or 3, y can only be 1, and

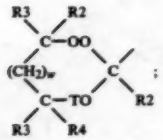
(I) when y is 1 and z is 1,

P is a peroxide-containing mono-radical having a structure:









where

w is 1 or 2;

R is a substituted or unsubstituted t-alkyl radical of 4 to 12 carbons, a substituted or unsubstituted t-aralkyl radical of 9 to 13 carbons, a t-cycloalkyl radical of 5 to 12 carbons or a substituted or unsubstituted t-alkynyl radical of 5 to 10 carbons;

R1 is a substituted or unsubstituted branched or unbranched, alkyl radical of 1 to 13 carbons, a substituted or unsubstituted cycloalkyl radical of 5 to 10 carbons, a substituted or unsubstituted, branched or unbranched, aralkyl radical of 7 to 11 carbons, or a substituted or unsubstituted aryl radical of 6 to 10 carbons;

R1' is a substituted or unsubstituted, branched or unbranched, alkyl radical of 1 to 13 carbons, a substituted or unsubstituted cycloalkyl radical of 5 to 10 carbons, or a substituted or unsubstituted, branched or unbranched, aralkyl radical of 7 to 11 carbons;

R2 and R3 are the same or different and are substituted or unsubstituted alkyl radicals of 1 to 4 carbons;

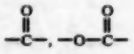
the substituents for R, R1, R1', R2 and R3 being alkyl radicals of 1 to 4 carbons, chloro or bromo;

R4 is hydrogen, a substituted or unsubstituted alkyl radical of 1 to 10 carbons or a substituted or unsubstituted aryl radical of 6 to 10 carbons, the R4 substituents being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo or carboxy;

T is nothing or —)—;

R11 is a substituted or unsubstituted alkylene diradical of 2 to 8 carbons or a substituted or unsubstituted 1,2-, 1,3- or 1,4-phenylene diradical, the R11 substituents being alkyl radicals of 1 to 4 carbons, chloro or bromo;

X is nothing,

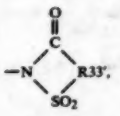


or —C(R2)(R3)—;

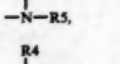
R22 is nothing, a substituted or unsubstituted alkylene diradical of 2 to 10 carbons or a substituted or unsubstituted 1,2-, 1,3- or 1,4-phenylene diradical, the R22 substituents being alkyl radicals of 1 to 3 carbons, chloro or bromo;

Q is a nitrogen-containing radical having a nitrogen-containing structure (a), (b), (c), (d) or (e), or a recurring unit in an addition polymer of ethylenic monomers having a structure (f) or (g):

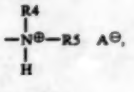
(a)



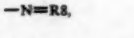
(b)



(c)



(d)



(e)

where

R33 is a substituted or unsubstituted 1,2- or 1,3- alkylene diradical of 2 to 18 carbons, a substituted or unsubstituted 1,2- or 1,3-alkenylene diradical of 2 to 18 carbons, a substituted or unsubstituted 1,2-cycloalkylene diradical of 5 to 6 carbons, a substituted or unsubstituted 1,2-cycloalkenylene diradical of 5 to 6 carbons, a substituted or unsubstituted 1,2-bicycloalkylene diradical of 7 to 9 carbons, a substituted or unsubstituted 1,2-bicycloalkenylene diradical of 7 to 9 carbons, a substituted or unsubstituted 1,2-phenylene diradical, a substituted or unsubstituted 1,2-naphthenylene diradical, a substituted or unsubstituted 2,3-naphthenylene diradical or a substituted or unsubsti-

tuted 1,8-naphthenylene diradical, the R33 substituents being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo, nitro, carboxy, alkoxy radicals of 1 to 8 carbons or alkoxycarbonyl radicals of 2 to 9 carbons;

R33' is a substituted or unsubstituted 1,2-phenylene diradical, the R33, substituents being one or more alkyl radicals of 1 to 8 carbons, chloro or bromo;

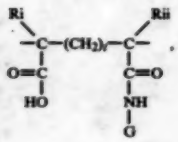
$A^{\ominus}$ is chloride, bromide, sulfate, acid sulfate, phosphate, acid phosphate, p-methylphenylsulfonate, phenylsulfonate, methylsulfonate, phenylphosphonate, cyclohexylphosphonate or carboxylate from any carboxylic acid;

R5 is hydrogen, a substituted or unsubstituted acyl radical of 1 to 18 carbons, a substituted or unsubstituted alkenoyl radical of 3 to 10 carbons, a perfluoroacyl radical of 2 to 18 carbons, a substituted or unsubstituted aroyl radical of 7 to 11 carbons, a substituted or unsubstituted cycloalkylcarbonyl radical of 6 to 13 carbons, a substituted or unsubstituted cycloalkenylcarbonyl radical of 6 to 13 carbons, a substituted or unsubstituted bicycloalkylcarbonyl radical of 6 to 13 carbons, a substituted or unsubstituted alkoxycarbonyl radical of 2 to 19 carbons, a substituted or unsubstituted alkenyloxycarbonyl radical of 3 to 8 carbons, a substituted or unsubstituted aryloxycarbonyl radical of 7 to 11 carbons, a substituted or unsubstituted cycloalkoxycarbonyl radical of 6 to 13 carbons, a substituted or unsubstituted alkylaminocarbonyl radical of 2 to 19 carbons, a substituted or unsubstituted alkenylaminocarbonyl radical of 3 to 8 carbons, a substituted or unsubstituted arylaminocarbonyl radical of 7 to 11 carbons, an alkylsulfonyl radical of 1 to 8 carbons or, a substituted or unsubstituted arylsulfonyl radical of 6 to 10 carbons:

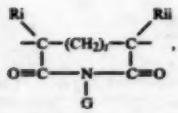
the R5 substituents being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo, nitro, carboxyl, alkoxy radicals of 1 to 8 carbons or alkoxycarbonyl radicals of 2 to 9 carbons, with the proviso that when R22 is nothing, the R5 substitutents can additionally be a t-alkylperoxycarbonyl radical of 5 to 9 carbons, a t-alkylperoxycarbonyloxy radical of 5 to 9 carbons, or a t-alkylperoxy radical of 4 to 8 carbons;

R8 is a substituted or unsubstituted alkylidene diradical of 2 to 12 carbons, a substituted or unsubstituted cycloalkylidene diradical of 5 to 12 carbons, optionally possessing as one or more heteroatoms N, O or S in the cycloalkylidene chain, or a substituted or unsubstituted benzylidene diradical of 7 to 11 carbons, the R8 substituents being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo, carboxy or nitro;

the recurring unit in polymer structures (f) and (g) being, respectively:



(f)



(g)

in which the recurring units (f) or (g) occur in the polymer backbone or as pendant units or both, where

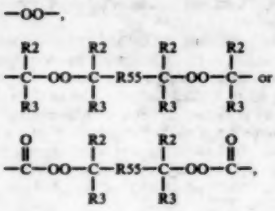
Ri and Rii are the same or different and are hydrogen, an alkyl radical of 1 to 6 carbons, a cycloalkyl radical of 5 to 7 carbons, phenyl, chloro or bromo;

t is 0 or 1; and

G shows the point of attachment of group Q to the residue of Structure A;

(II) when y is 1 and z is 2,

P is a peroxide-containing diradical having a structure:



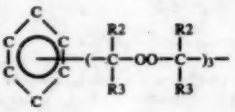
where

R55 is an alkylene diradical of 1 to 6 carbons, an alkynylene diradical of 2 to 6 carbons, an alkadiynylene diradical of 4 to 8 carbons or a 1,3- or 1,4-phenylene diradical; and

R11, X, R22, Q, R, R1, R2, R3 and x are the same as when y is 1 and z is 1, with the proviso that Q cannot be the above-defined recurring unit (f) or (g) in a polymer;

(III) when y is 1 and z is 3,

P is a peroxide-containing tri-radical having a structure:



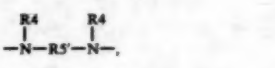
where R11, X, R22, Q, R, R1, R2, R3 and x are the same as when y is 1 and z is 1, with the proviso that Q cannot be the above-defined recurring unit in a polymer; and

(IV) when z is 1 and y is 2,

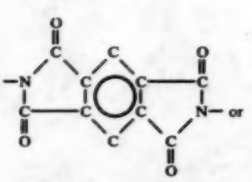
P, R11 and X are the same as when y is 1 and z is 1;

R22 is nothing; and

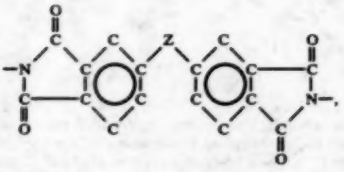
Q is a nitrogen-containing diradical having a structure (m), (n) or (o);



(m)



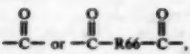
(n)



(o)

where

R5' is $—SO_2—$,



where R66 is nothing or a diradical having a structure:

—R77—,

—Y—R77—Y—,

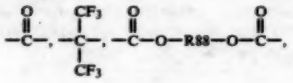
—R77—Z—R77— or

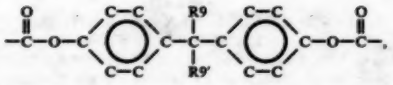
—Y—R77—Z—R77—Y—,

where

R77 is a substituted or unsubstituted alkylene diradical of 2 to 10 carbons, optionally having one or more —O— or —S— heteroatoms in the alkylene chain, or a substituted or unsubstituted 1,2-, 1,3- or 1,4-phenylene diradical, the R77 substituted being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo, carboxy, nitro or alkoxy radicals of 1 to 8 carbons;

Z is nothing or a substituted or unsubstituted alkylene diradical of 1 to 8 carbons, or a diradical having a structure:





where

R9 and R9′ are the same or different and are hydrogen or alkyl radicals of 1 to 10 carbons, and R9 and R9′ can be connected together to form a carbocyclic ring containing 5 to 12 carbons and having substituents of one or more alkyl radicals of 1 to 4 carbons; and

R88 is a substituted or unsubstituted alkylene diradical of 2 to 10 carbons, the R88 substituents being alkyl of 1 to 8 carbons, chloro, bromo, carboxy, alkoxy radicals of 1 to 8 carbons, alkoxycarbonyl radicals of 1 to 8 carbons, acyloxycarbonyl radicals of 1 to 8 carbons or nitro.

4,956,417

NITRILE GROUP-CONTAINING HIGHLY SATURATED COPOLYMER RUBBER AND RUBBER COMPOSITION HAVING IMPROVED COLD RESISTANCE

Sachio Hayashi, Tokyo; Yoichiro Kubo, Yokohama; Noboru Watanabe, Yokohama, and Yoshiaki Aimura, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,862

Claims priority, application Japan, Mar. 24, 1988, 63-70454

Int. Cl.[5] C08F 8/04

U.S. Cl. 525—327.7 **12 Claims**

1. A nitrile group-containing, highly saturated copolymer rubber, the copolymer chain of which comprises, based on the weight of the copolymer chain, (1) 5 to 40% by weight of units of an unsaturated nitrile monomer, (2) 15 to 80% by weight of units of a mono- or dialkyl ester of an unsaturated dicarboxylic acid having 1 to 8 carbon atoms in the alkyl group and (3) up to 20% by weight of units of a conjugated diene monomer, with the balance being (4) units of a hydrogenated conjugated diene monomer, wherein the sum of the contents of the monomer units (1) and (2) is 30 to 90% by weight and the sum of he contents of the monomer units (3) and (4) is 10 to 70% by weight.

4,956,418

IONOMER RESIN AND PREPARATION OF SAME

Masato Tanaka, and Shuji Machida, both of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,235

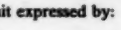
Claims priority, application Japan, Apr. 30, 1987, 62-104530

Int. Cl.[5] C08F 8/42, 30/04

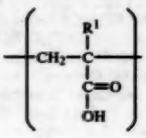
U.S. Cl. 525—330.6 **8 Claims**

1. An ionomer resin having a weight-average molecular weight of at least 5,000 and containing as the primary components:

(A) a repeating unit expressed by:

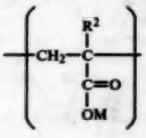


(B) a repeating unit expressed by:



wherein R^1 stands for a hydrogen or halogen atom, an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 3 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms or an aralkyl group having 7 to 20 carbon atoms, and

(C) a repeating unit expressed by:



wherein R^2 stands for a hydrogen or halogen atom, an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 3 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms or an aralkyl group having 7 to 20 carbon atoms, and M denotes an ion of a metal of Group I, II, III, IVA or VIII in the periodic table;

said repeating units being arranged randomly and linearly with the total proportion of said repeating units (B) and (C) contained being 0.001 to 45 mol %.

4,956,419

FLUORINE-CONTAINING POLYMERS WITH PENDENT THIOORGANO GROUPS AND METHOD OF MAKING SAID POLYMERS

Robert E. Kolb; Paul F. Tuckner, and Richard A. Guenthner, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 165,936, Mar. 9, 1988, Pat. No. 4,894,410. This application Nov. 20, 1989, Ser. No. 429,072

Int. Cl.[5] C08F 8/34

U.S. Cl. 525—342 **10 Claims**

1. A method of making fluorine-containing polymers said polymers consisting essentially of

(A) fluorine-containing homo- or co-polymer containing 20 to 76 weight percent carbon-bonded fluorine and comprising interpolymerized, repeating units of one or more fluoromonomers, and optionally one or more non-fluorinated monomers, wherein said non-fluorinated monomers are selected from the group consisting of ethylene, propylene and butene, and

(B) a plurality of pendent, monothiorgano groups;

comprising the step of reacting a fluoropolymer precursor with at least one thiolate compound.

4,956,420

SELECTIVE CATALYTIC PROCESS FOR CONTROLLED MODIFICATION OF ETHYLENE-(ALPHA-OLEFIN)-DIENE MONOMER TERPOLYMER WITH HALOTHISULFONAMIDE

Donald A. White, Edison; Richard S. Auda; William M. Davis, both of Westfield, and David T. Ferrughelli, Bridgewater, all of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Sep. 15, 1988, Ser. No. 244,743
Int. Cl.[5] C08C *19/22*
U.S. Cl. 525—351 **35 Claims**

1. A process for modifying

(a) a terpolymer comprising ethylene, at least one additional alpha-olefin, and at least one non-conjugated diene monomer, wherein said alpha-olefin contains 3 to 16 carbon atoms and wherein said non-conjugated diene is present at greater than about 0.2 weight percent based on the total weight of the terpolymer, and wherein said non-conjugated diene, following incorporation in said terpolymer, does not include an olefinic carbon atoms which is fully substituted, with

(b) N-halothiosulfonamide of the formula

wherein the mole ratio of said N-halothiosulfonamide to unsaturated sites in said terpolymer is in the range of about 0.03/1 to about 1/1, where R^1 and R^2 are selected from the group consisting of alkyl radicals having 1–20 carbon atoms, aralkyl radicals having 7–20 carbon atoms, aryl and haloaryl radicals having 6–10 carbon atoms and where R^1 is also selected from radicals having the formula

wherein R^3 and R^4 are individually selected from alkyl aralkyl, aryl and haloaryl radicals and where R^3 and R^4 can be joined together to represent radicals selected from $-(CH_2)_n-$ where n is an integer of 4 to 7, and $-(CH_2)_2-O-(CH_2)_2-$ where X is selected from chlorine and bromine, which comprises bringing (a) and (b) into reactive contact at a temperature ranging from about 40° C. to about 170° C. in the presence of a catalyst of the formula MAn, wherein A is an anion or mixture of anions of a weak acid, M is a metal selected from the group consisting of copper, antimony, bismuth and tin, and n is a number corresponding to the oxidation state of M divided by the valence of said weak acid anion.

4,956,421

PREPARATION OF OXYALKYLATED, CARBOXYL-CONTAINING POLYMERS

Walter Denzinger, Speyer; Heinrich Hartmann, Limburgerhof; Richard Baur, Mutterstadt; Johannes Perner, Neustadt; Wolfgang Trieselt, Ludwigshafen; Horst Trapp, Plankstadt, and Hans-Juergen Raubenheimer, Ketsch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 19, 1989, Ser. No. 367,680
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821518
Int. Cl.[5] C08F *8/00*
U.S. Cl. 525—385 **9 Claims**

1. A process for the preparation of an oxyalkylated, carboxyl-containing polymer, wherein

(A) a polymer which contains one or more monoethylenically unsaturated C_3–C_6-carboxylic acids as copolymerized units is reacted with

(B) ethylene oxide, propylene oxide, n-butylene oxide, isobutylene oxide or a mixture of these in an aqueous medium at not more than 120° C., the reaction being started at a pH of from 5.0 to 5.9 and being ended after a pH of from 5.5 to 8.5 has been reached.

4,956,422

BLENDS OF POLYPHENYLENE ETHER AND MODIFIED POLYESTERS

John C. Falk, Northbrook, Ill., and Klementina Khait, Parkersburg, W. Va., assignors to General Electric Company, Parkersburg, W. Va.

Filed Oct. 27, 1988, Ser. No. 263,382
Int. Cl.[5] C08L *71/12*
U.S. Cl. 525—392 **9 Claims**

1. A thermoplastic polymer blend composition, comprising

(a) a polyphenylene ether, and

(b) a polyester modified with a hydroxy- or carboxy-terminated polystyrene, the hydroxy- or carboxy-terminated polystyrene being included in an amount sufficient to improve notched Izod impact, heat distortion temperature or smooth surface appearance modified with a property improving amount of a hydroxy- or carboxy-terminated polystyrene.

4,956,423

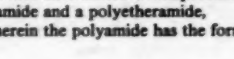
HOT-MELT ADHESIVES

Chung J. Lee, Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 29, 1985, Ser. No. 792,430
Int. Cl.[5] C08L *77/00*
U.S. Cl. 525—432 **15 Claims**

1. A hot melt adhesive composition comprising a blend of a polyamide and a polyetheramide,

wherein the polyamide has the formula

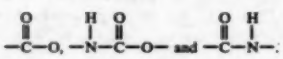


wherein A is a linear, branched or cyclic aliphatic hydrocarbon radical and B is a branched, saturated or unsaturated, aliphatic hydrocarbon radical, and x is 5 to about 500;and

wherein the polyetheramide has the formula

PA—Y—PE)$_m$

wherein PA represents a non-branched polyamide segment and PE represents polyether segment, m is an integer in the range from 5 to about 100, Y is a group selected from



4,956,424

POLY (ALKYLENE CARBONATE) POLYAHLS HAVING MORE THAN ONE PENDANT ACID GROUP

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 914,686, Oct. 2, 1986, Pat. No. 4,879,357. This application May 18, 1989, Ser. No. 353,724
Int. Cl.[5] C08F 283/02
U.S. Cl. 525—462 15 Claims

1. An acid-functional polymer having a poly(alkylene carbonate) backbone and on the average greater than one terminal acid group per molecule, wherein the poly(alkylene carbonate) backbone contains at least one modifier.

4,956,425

POLYMERIZED MONOMERS IN UNSATURATED COMPOUND-REACTED EPOXY RESINS ADVANCED WITH DIHYDRIC PHENOL

Robert E. Hefner, Jr., Lake Jackson, and Deborah I. Haynes, Freeport, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 126,397, Nov. 30, 1987, Pat. No. 4,835,228, which is a continuation-in-part of Ser. No. 849,616, Apr. 8, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 316,847
Int. Cl.[5] C08G 59/16
U.S. Cl. 525—524 24 Claims

1. A thermosettable or curable composition comprising a curing amount of a suitable curing agent and an advanced epoxy resin composition which comprises the product resulting from

(I) polymerizing in the presence of a catalytic quantity of at least one suitable polymerizable catalyst

(A) the reaction product of

(1) a mixture comprising

(a) from about 80 to about 99 percent by weight of at least one diglycidyl ether of a dihydric phenol or diglycidyl ether of a dihydric cyclohexanol having an epoxide equivalent weight of from about 111 to about 350 with the epoxide equivalent weight being calculated on the basis that there are no substituent groups attached to the aromatic ring(s) or cycloaliphatic ring(s) other than hydrogen and the ether oxygen atoms even through the aromatic ring(s) or cycloaliphatic ring(s) may in fact be substituted by groups other than hydrogen and the ether oxygen atoms;

(b) from about 1 to about 20 percent by weight of at least one diglycidyl ether of a mono-, di- or polyetherdiol; with

(2) at least one compound containing both a group reactive with an epoxide group and a polymerizable ethylenically unsaturated group in an amount of from 0.001 to about 0.05 equivalent per epoxide equivalent contained in component (A-1); with

(B) a monomer mixture comprising

(1) at least one vinyl aromatic monomer in an amount of from about 31 to about 60 percent by weight of the combined weight of components (A), (B) and (C);

(2) at least one compound containing both a group reactive with an epoxide group and a polymerizable ethylenically unsaturated group in an amount of from about 0.001 to about 0.05 equivalent per epoxide equivalent contained in component (A-1); and

(3) one or more hydroxyalkyl acrylate, hydroxyalkyl methacrylate, alkyl acrylate or alkyl methacrylate in an amount of from about zero to about 15 percent by weight of the combined weight of components (B-1) and (B-3); and

(II) advancing in the presence of a catalytic quantity of at least one suitable advancement catalyst, the product resulting from (I) with

(C) at least one dihydric phenol in an amount of from about 0.125 to about 0.8 hydroxyl equivalent per epoxide equivalent in component (A-1).

4,956,426

PROCESS FOR CONTROLLED POLYMERIZATION OF STEREOSPECIFIC ALPHA-OLEFINS HAVING PRESELECTED ISOTACTICITY

George G. Ardell, South Charleston, W. Va.; Reginald W. Geck, Victoria, Tex.; John M. Jenkins, III, and William G. Sheard, both of South Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jul. 24, 1986, Ser. No. 889,799
Int. Cl.[5] C08F 2/34, 10/06
U.S. Cl. 526—60 4 Claims

1. A continuous process for the polymerization of propylene monomer in a fluidized bed reactor system using a catalyst having a predictable relationship between catalyst productivity and isotacticity, a cocatalyst including aluminum alkyl and a selectivity control agent (SCA) wherein the polypropylene isotacticity of the polypropylene product from the reactor system is regulated to a relatively constant value within a preselected range to provide optimum isotacticity comprising the steps of:

(a) formulating a model of the characteristic relationship between catalyst productivity and the isotacticity of the polypropylene product produced in the reactor system;

(b) selecting a target catalyst productivity value from the model based on a preselected isotacticity level for the polypropylene product within said preselected range;

(c) monitoring the catalyst flow rate to the reactor;

(d) calculating the instantaneous production rate of polypropylene in the reactor system from energy data from the reactor;

(e) computing an instantaneous value of catalyst productivity by dividing the instantaneous production rate from step (d) with the catalyst flow rate from step (c);

(f) comparing the computed instantaneous value of catalyst productivity from step (e) with the target value of step (b); and

(g) adjusting the molar feed ratio of the catalyst components SCA to alkyl when the comparison of step (f) shows a difference to cause the instantaneous value of catalyst productivity to change n the direction toward the target value.

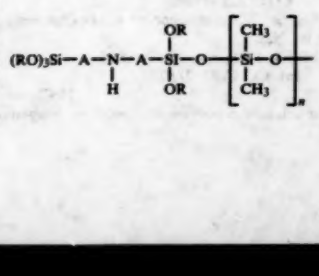
4,956,427

PROCESS FOR REDUCING POLYMER BUILD-UP IN POLYMERIZATION EQUIPMENT DURING POLYMERIZATION OF ALPHA-OLEFINS

John M. Jenkins, III, S. Charleston, W. Va.; James D. McCullough, Jr., Houston, Tex., and Steven P. Sawin, Bridgewater, N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Dec. 23, 1988, Ser. No. 289,266
Int. Cl.[5] C08F 2/34; F16L 58/04
U.S. Cl. 526—62 10 Claims

1. A method for the prevention of fouling of metallic surfaces exposed to reactive alpha-olefin gases during the production of polymeric resins which comprise coating such metallic surfaces with an amino silicone fluid of general formula:



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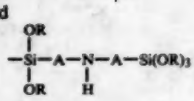


wherein:

each R is independently a lower alkyl of from 1 to 4 carbon atoms;

A is an alkylene group having from 2 to 6 carbon atoms; and

n is a number ranging from about 5 to about 600 and thereafter curing said coating by hydrolysis to form a continuous solid coating.

4,956,428

RATE-MODERATED GROUP TRANSFER POLYMERIZATION

Anthony Pickering, Kingsley; Andrew J. Thorne, Upton, and Peter J. I. Runciman, Newton, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Filed Feb. 16, 1989, Ser. No. 311,049

Claims priority, application United Kingdom, Feb. 18, 1988, 8803765

Int. Cl.[5] C08F *4/44*

U.S. Cl. 526—190 **4 Claims**

1. A polymerisation process which comprises contacting at least one polar acrylic or maleimide monomer under polymerisation conditions with (i) a tetracoordinate organosilicon, organotin or organogermanium initiator having at least one initiating site and (ii) a co-catalyst which is a complex obtained by the interaction of a source of fluoride, bifluoride, cyanide or azide ions or a Lewis acid with a complexing agent which is an active hydrogen compound selected from the group consisting of alcohols, phenols, amines, carboxylic acids, diketones or oximes.

4,956,429

METHOD OF MAKING A COCA LEAF FLAVOR EXTRACT

Ronald Harmetz, Randolph; Louis A. Laurenzo, Rutherford, and David V. Petrocine, Saddle River, all of N.J., assignors to Penick Corporation, Newark, N.J.

Filed Mar. 1, 1989, Ser. No. 317,608

Int. Cl.[5] A23L *2/38*

U.S. Cl. 426—271 **23 Claims**

1. A method of making a coca flavor extract comprising the steps of:

(a) forming a raw extract of coca leaves incorporating flavors from said leaves together with one or more alkaloids selected from the group consisting of cocaine and ecgonine in a solvent;

(b) contacting said raw extract with a cation exchange resin so that said exchange resin takes up said one or more alkaloids in said raw extract to transform said raw extract into a flavor extract substantially devoid of said one or more alkaloids; and

(c) physically separating said flavor extract substantially devoid of said one or more alkaloids from the resin.

4,956,430

PROCESS FOR PREPARING SUBSTANTIALLY PURE HIGH MOLECULAR WEIGHT VINYL LACTAM-QUATERNIZED ACRYLAMIDE COPOLYMERS

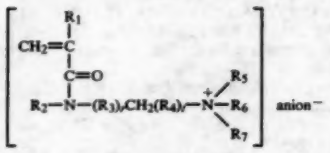
Mohammed Tazi, Wayne, N.J., assignor to GAF Chemicals Corporation, Wayne, N.J.

Filed May 1, 1989, Ser. No. 345,820

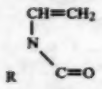
Int. Cl.[5] C08F *2/10*

U.S. Cl. 526—195 **11 Claims**

1. The process for solution copolymerization, in an oxygen-free atmosphere of a quaternized amino acrylamide monomer having the formula:



with a vinyl lactam monomer having the formula:



wherein R is alkylene having from 3 to 8 carbon atoms and is optionally substituted with lower alkyl; R_1 and R_2 are each independently hydrogen or methyl; R_3 and R_4 are each independently alkylene having from 1 to 18 carbon atoms which is optionally substituted with alkyl; the sum of r and t is 1to 3; R_5 and R_6 are each independently lower alkyl; R_7 is hydrogen, alkyl, aralkyl or alkaryl having from 1 to 8 carbon atoms or an N-alkylene lactam radical having from 3 to 8 ring carbon atoms and the anion is an acidic anion which process comprises buffering the system before contacting said lactam and quaternized monomer with an aqueous solution containing between about 0.05 and about 0.5 weight % based on lactam of a buffer chelating agent having complexing properties having a pH greater than 5.5, contacting said monomers in the presence of continuous or incremental addition of an organic free radical initiator, controlling the pH of the system to above about 5.5 throughout the reaction and reacting said monomers under a continuous ebullition of nitrogen under conditions conducive to polymerization for a period of from about 1 to about 10 hours and recovering the quaternized copolymer of from about 2 to about 15 wt. % quaternized amino acrylamide, from about 85 to about 98 weight % vinyl lactam and less than 0.5 wt. % total unreacted monomer.

4,956,431

POLYMERIZABLE COMPOUND HAVING MILDEW RESISTANCE AND POLYMER THEREOF

Hideyuki Mitamura, and Yoshikazu Arimatsu, both of Shiga, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

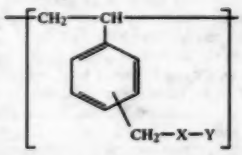
Continuation-in-part of Ser. No. 111,801, Oct. 23, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 268,956

Claims priority, application Japan, Oct. 24, 1986, 61-254411; Nov. 4, 1986, 61-263128; Nov. 4, 1986, 61-263129; Apr. 30, 1987, 62-108237

Int. Cl.[5] C08F *128/00, 126/06*

U.S. Cl. 526—257 **7 Claims**

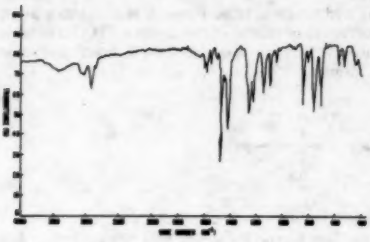
1. A mildew resistant linear, addition polymer comprising a repeating unit of the formula:



[II]

wherein X-Y is a residue of a compound selected from the group consisting of 8-hydroxyquinoline, 2-(4'-thiazolyl)ben-

zimidazole, 1,2-benzoisothiazoline-3-one and 2-pyridinethiol-1-oxide.



4,956,432

HYDROPHILIC TRANSPARENT CROSSLINKED COPOLYMER AND THE METHOD FOR PRODUCING THEREOF

Jiří Vacík; Blahoslav Obereigner, and Dana Soucková, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

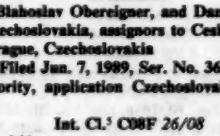
Filed Jun. 7, 1989, Ser. No. 362,763

Claims priority, application Czechoslovakia, Jun. 8, 1988, PV3974

Int. Cl.[5] C08F *26/08*

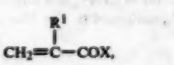
U.S. Cl. 526—264 **12 Claims**

1. Hydrophilic copolymer, prepared by the radical copolymerization of the monomers of general formula I



(I)

where R is hydrogen or methyl, either alone or in their combinations, or by copolymerization of the monomers with general formula I and the monomers with general formula II



(II)

where R^1 means hydrogen or methyl and X is a group OCH_2CH_2OH, $OCH_2CH(OH)CH_3$, $OCH_2CH(OH)CH_2OH$, $(OCH_2CH_2)_3OH$, $(OCH_2CH_2)_2OH$, alkoxyl OCH_3 to $OC_{16}H_{33}$, NH_2, $NHCH_2CH(OCH)CH_3$, $N(C_2H_5)_2$, and NH-tert-C_4H_9, whereas the content of monomers with the general formulae I and II amounts to 40 to 99.99 wt.-% of the entire mixture, where at least 5 wt.-% is formed by the monomers of general formula I, and with 0.01 to 60 wt.-% of a crosslinking agent related to the entire monomer mixture, which contains at least two olefinic bonds, in the presence of radical initiators.

4,956,433

TELECHELIC POLYMERS FROM THIURAM DISULFIDE OR DITHIOCARBAMATES

Thomas Mezger, Erlenbach/Main, Fed. Rep. of Germany, assignor to Akzo N.V., Netherlands

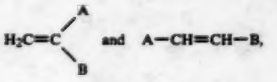
Continuation of Ser. No. 25,561, Mar. 13, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 271,407

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1986, 3608556

Int. Cl.[5] C08F *36/04, 26/06*

U.S. Cl. 526—265 **8 Claims**

1. Telechelic polymers based on ethylenically unsaturated monomers selected from the group of formulas consisting of



(IX) (X)

wherein

A=H, CH_3, Cl, CN, COOR, CH_2—COOR

B=COOR, $CH{=}CH_2$, Cl, CN, C_6H_5, C_6H_4Cl, p-methyl-phenyl chloromethyl or pyridyl,

R=alkyl residue with 1–12 C atoms,

radically polymerized by dithiocarbamate initiators, said telechelic polymers having been formed by polymerization with at least one initiator selected from the group consisting of thiuram disulfides and dithiocarbamates which have at least one additional reactive functional group in addition to a carbamate group, wherein said additional reactive functional group is at least one of amino groups, hydroxy groups, carboxyl groups and carbonyl groups.

4,956,434

RUBBERY CARBOXYLATED ACRYLATE POLYMER, LATEX, AND PREPARATION THEREOF

Vic Stanislawczyk, North Ridgeville, Ohio, assignor to The B. F. Goodrich Company, Brecksville, Ohio

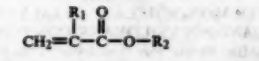
Continuation-in-part of Ser. No. 310,262, Feb. 13, 1989, Pat. No. 4,879,364, which is a continuation-in-part of Ser. No. 921,166, Oct. 20, 1966, abandoned. This application Jun. 6, 1989, Ser. No. 376,281

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[5] G08F *122/02*

U.S. Cl. 526—318.2 **16 Claims**

1. A rubbery carboxylated acrylate polymer consisting essentially of predominantly acrylate-containing, cross-linked polymer chains including repeating units derived from itaconic acid and an acrylate represented by the structure



(I)

wherein R_1 is hydrogen or methyl;

R_2 represents C_1–C_{20} alkyl, C_2–C_7 alkoxyalkyl, C_2–C_7 alkylthioalkyl, or C_2–C_7 cyanoalkyl;

said crosslinking is effected by a crosslinking monomer present in an amount in the range from 0.1 phr to 20 phr;

said itaconic acid is present in the range from about 1 phr to about 20 phr;

at least 40 phr of said acrylate in said polymer is present as an alkyl acrylate in which alkyl is C_4–C_8; and,

said polymer has a T_g in the range from −20° C. to −60° C.

4,956,435
NEUTRAL CURE SILICONE SEALANTS

Hsien-Kun Chu, Wethersfield Township, Hartford County, Conn.; Russell P. Kamis, Willard Township, County of Bay, Mich.; Jerome M. Klosowski, Monitor Township, County of Bay, Mich., and Loren D. Lower, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 22, 1989, Ser. No. 327,209
Int. Cl.[5] C08G 77/06
U.S. Cl. 528—17 **10 Claims**

1. A neutral cure silicone composition comprising

(A) 100 parts by weight of polymer of the formula

where each R is free of aliphatic unsaturation and is selected from the group consisting of monovalent hydrocarbon, monovalent halohydrocarbon, and monovalent cyanoalkyl radicals of 1 to 18 inclusive carbon atoms, each D is selected from the group consisting of vinyl radical and radical of the formula

$$(R''O)_3\,Si\,Z$$

where each R'' is methyl, ethyl, propyl, or butyl, Z is a divalent hydrocarbon radical or combination of divalent hydrocarbon radicals and siloxane radicals, and x is of a value such that the polymer has a viscosity of from 0.5 to 3000 Pa.s at 25° C., the amount of vinyl radical of D being from 0 to 40 percent of the total of endblocking radicals D,

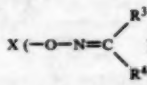
(B) from 0.1 to 14 parts by weight of a crosslinker of the formula

$$R'_aSi(OR'')_{4-a}$$

where R' is methyl or phenyl. R'' is methyl, ethyl, propyl, or butyl, and a is 0, 1, or 2,

(C) from 0.2 to 6.0 parts by weight of titanium catalyst, and

(D) from 0.5 to 4 parts by weight of an oxime compound of the formula.



where X is chosen from the group consisting of hydrogen and $R^5{}_pSi$, R^3 is a hydrocarbon of from 1 to 18 carbon atoms, R^4 is a hydrocarbon of from 1 to 18 carbon atoms, R^5 is a hydrocarbon of from 1 to 18 carbon atoms, n is equal to the valence of X and p is 1 or 2.

4,956,436
TIN MONOCHELATE CATALYSIS OF ORGANOPOLYSILOXANE COMPOSITIONS

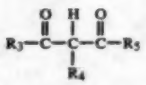
Michel Letoffe, Sainte Foy Les Lyon; Claude Millet, Saint-Priest, and Serge Serafini, Venissieux, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 27, 1988, Ser. No. 211,916
Claims priority, application France, Jun. 25, 1987, 87 09180
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.
Int. Cl.[5] C08G 77/06
U.S. Cl. 528—18 **6 Claims**

1. An organopolysiloxane composition of matter curable into elastomer state, comprising (1) a curable organopolysiloxane base which is an organopolysiloxane polymer and a crosslinking agent therefor, and (2) a catalytically effective amount of the product of reaction between (a) a tin salt of the formula:

$$(X)_2SnR_1R_2 \qquad (I)$$

in which the symbols R_1 and R_2, which may be identical or different, are each an optionally substituted, monovalent C_1–C_{18} hydrocarbon radical and X is a halogen atom or a monocarboxylate radical of the formula R_6COO in which the symbol R_6 is the same R_1, with (b) a β-dicarbonyl compound of the formula:



in which:

the symbols R_3 and R_5, which may be identical or different, are each a radical R_1 or R_2, a hydrogen atom, a C_1–C_5 alkoxy radical or an $Si(R_1)_3$ silyl radical; and

the symbol R_4 is a hydrogen atom, or an optionally halogenated C_1–C_{18} hydrocarbon radical, with the proviso that R_4 and R_5 may together form, with the carbon atoms from which they depend, a divalent C_5–C_{12} cyclic hydrocarbon radical, or an optionally substituted such hydrocarbon radical bearing at least one chloro, nitro and/or cyano substituent, in a molar ratio (2)/(1) ranging from 0.01 to 100, said product of reaction being a monochelate of pentacoordinated tin of valency IV.

4,956,437
SOLUBLE POLYIMIDESILOXANES AND METHODS FOR THEIR PREPARATION AND USE

Chung J. Lee, E. Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Jun. 10, 1988, Ser. No. 205,412
Int. Cl.[5] B05D 3/02; C08F 2/46; C08G 77/04
U.S. Cl. 528—26 **54 Claims**

1. In a substantially fully imidized polyimidesiloxane comprising the reaction product of an organic dianhydride, a difunctional siloxane monomer, and an organic diamine, the improvement wherein the polyimidesiloxane is soluble in diglyme and the organic dianhydride comprises a sulfurdiphthalic anhydride (SDPA).

4,956,438
BULK POLYURETHANE IONOMERS

Sven H. Ruetman, Walnut Creek, and Joginder N. Anand, Clayton, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 8, 1989, Ser. No. 308,350
Int. Cl.[5] C08G 18/12
U.S. Cl. 528—60 **17 Claims**

1. A bulk polyurethane ionomer prepared by the reaction of (A) an isocyanate terminated ionic prepolymer with (B) a hydrocarbon polyol chain extender said prepolymer having been prepared from (i) an excess of a diisocyanate, (ii) a mixture comprising a diol and an organic polyol having three or more reactive hydroxyl groups each having a molecular weight of from about 250 to about 6,000 and (iii) a difunctional isocyanate-reactive component containing an ionic group or potential ionic group.

4,956,439

HIGH PERFORMANCE MODIFIED POLYURETHANES

Shen-Nan Tong, #9, Lane 182, Lin-Shen Road; Shih-Jung Tsai, #10, Alley 7, Lane 10, Sec. 2, Chien-Kung Rd., both of Hsin-chu, and Jyi-Shang Lii, #137, Sec. 2, San-Ho Road, San-chung City, all of Taiwan

Continuation of Ser. No. 152,134, Feb. 4, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,501

Int. Cl.[5] C08G 18/32, 18/18, 18/24

U.S. Cl. 528—53 9 Claims

1. A method for molding a heat resistant modified polyurethane, which comprises:

blending a polyol component containing at least 1% of at least one room temperature solid or semi-solid state polynuclear aromatic polyol or a derivative thereof, or mononuclear diol or a derivative thereof, at a temperature of from 100 to 180° C., so as to form a heated first liquid component;

admixing said heated first liquid component with a second liquid component containing a diisocyanate or a polyisocyanate, one of said components containing a catalyst; and

reacting and molding said admixture of the first and second liquid components in a mold maintained at a temperature of from 80° to 140° C.

4,956,440

ARYLAMINE CONTAINING POLYHYDROXYETHER RESINS

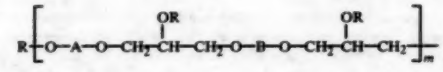
William W. Limburg, Penfield; Dale S. Renfer; John F. Yanus, both of Webster, and Leon A. Teuscher, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 61,064, Jun. 10, 1987, Pat. No. 4,818,650. This application Nov. 23, 1988, Ser. No. 276,190

Int. Cl.[5] C08G 59/28

U.S. Cl. 528—99 1 Claim

1. An arylamine polymer represented by the formula:

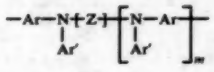


wherein:

R is selected from the group consisting of —H, —CH_3, and —C_2H_5;

m is between about 4 and about 1,000; and

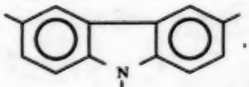
A is an arylamine group represented by the formula:

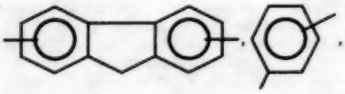


wherein:

m is 0 or 1,

Z is selected from the group consisting of:





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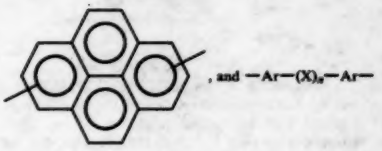
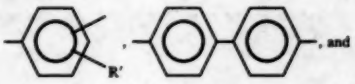
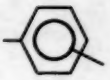


wherein:

n is 0 or 1,

Ar is selected from the group consisting of:

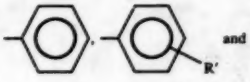


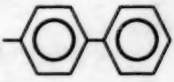


wherein:

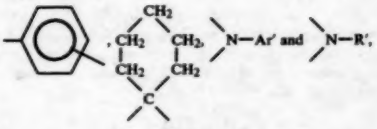
R^1 is selected from the group consisting of —CH_3, —C_2H_5, —C_3H_7 and —C_4H_9,

Ar′ is selected from the group consisting of:





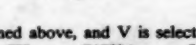
X is selected from the group consisting of: —CH_2—, —$C(CH_3)_2$—, —O—, —S—,



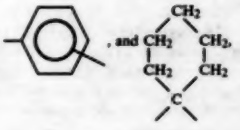
and

B is selected from the group consisting of:

the arylamine group as defined for A, and



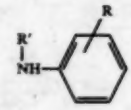
wherein Ar is as defined above, and V is selected from the group consisting of: —CH_2—, —$C(CH_3)_2$—, —O—, —S—,



and n is 0 or 1.

4,956,441
ELECTROCONDUCTIVE COPOLYMERS
Poopathy Kathirgamanthan, North Harrow; Philip N. Adams, London, both of United Kingdom; Kieran Quill, Douglas, Ireland, and Alan E. Underhill, Bangor, United Kingdom, assignors to Cookson Group PLC, United Kingdom
Filed Jul. 22, 1988, Ser. No. 222,779
Claims priority, application United Kingdom, Jul. 23, 1987, 8717458
Int. Cl.[5] C08G 59/00; C08F 8/00
U.S. Cl. 528—171 6 Claims

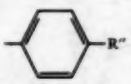
1. A copolymer of an aniline monomer of the general formula:



(I)

where

R is in the ortho- or meta- position and is selected from the group consisting of hydrogen, C_{1-18} alkyl, C_{1-6} alkoxy, amino, chloro, bromo, sulpho, carboxy, hydroxy and the group



(II)

where

R'' is selected from the group consisting of alkyl and aryl; and

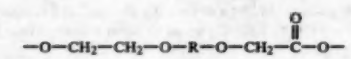
R' is selected from the group consisting of hydrogen, C_{1-6} alkyl and aryl; with at least one other aniline monomer of formula I as defined above, the copolymer including counterions X where X is selected from the group consisting of Cl^-, Br^-, $SO_4^=$, BF_4^-, PF_6^-, $H_2PO_3^-$, $H_2PO_4^-$, arylsulphonate, arenedicarboxylate, arenecarboxylate, polystyrene sulphonate, polyacrylate, alkylsulphonate, vinylsulphonate, vinylbenzene sulphonate, cellulose sulphonate, cellulose sulphate and a perfluorinated polyanion.

4,956,442
PROCESS FOR PREPARING POLY (VINYLBENZYL ETHERS) OF POLYPHENOLS
Ming-Diann Liu; James Godschalx; Ernest Ecker, and Alfred Caldecourt, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed Sep. 23, 1987, Ser. No. 100,067
Int. Cl.[5] C08G 65/40, 67/02; C07C 41/00
U.S. Cl. 528—205 23 Claims

1. A method of preparing a poly(vinylbenzyl ether) comprising the step of reacting an alkali metal, alkaline earth metal, or ammonium salt of a polyphenol with a vinylbenzyl halide in an essentially non-aqueous liquid reaction medium consisting essentially of a monohydric alcohol or glycol having less than 12 carbon atoms, a polyglycol having a weight average molecular weight ranging from about 200 to about 4000, or glycerol, said vinyl benzyl halide being in stoichiometric excess relative to the salt of the polyphenol.

4,956,443
POLYESTER FROM HYDROXYETHOXYPHENOXY ACETIC ACID WITH IMPROVE GAS BARRIER PROPERTIES
James R. Overton, Kingsport; Steven L. Stafford, Gray, and Charles E. Sumner, Jr., Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed May 30, 1989, Ser. No. 358,229
Int. Cl.[5] C08G 63/06
U.S. Cl. 528—206 4 Claims

1. A polyester having an inherent viscosity of at least 0.5 measured at 25 degrees C. in a 60/40 by weight mixture of phenol/tetrachloroethane at a concentration of 0.5 g/100 mL comprised of recurring units corresponding to the structure



wherein R is selected from the group consisting of

4,956,444
CHEMICAL SYNTHESIS OF STABLE AND ELECTROACTIVE POLYPYRROLE AND RELATED POLYHETEROCYCLIC COMPOUNDS
En-Tang Kang; Thiam C. Tan, and Koon G. Neoh, all of Singapore, Singapore, assignors to National University of Singapore, Kent Ridge, Singapore
Filed Apr. 9, 1987, Ser. No. 36,497
Int. Cl.[5] C08G 2/06, 2/18
U.S. Cl. 528—220 25 Claims

1. An electroactive polymer comprising the polymerized purely chemical reaction product of a five or six membered, heterocyclic ring monomer with an electron acceptor.

4,956,445
PROCESS FOR THE PREPARATION OF ACETAL POLYMER OR COPOLYMER
Kaoru Yamamoto; Hiroyuki Sano, and Shuichi Chino, all of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan
Filed Dec. 12, 1988, Ser. No. 283,433
Claims priority, application Japan, Dec. 25, 1987, 62-392240
Int. Cl.[5] C08G 2/10
U.S. Cl. 528—230 6 Claims

1. A process for the preparation of a normally solid, high molecular weight acetal polymer or copolymer, which process comprises polymerizing a principal monomer selected from anhydrous formaldehyde or a cyclic oligomer of formaldehyde, and optionally a comonomer polymerizable therewith, in the presence of between 0.1 to 5000 ppm, based on the total weight of said principal monomer and, optionally said comonomer, of a polymerization catalyst selected from heteropoly acids and acid salts of heteropoly acids.

4,956,446
POLYESTER FIBER WITH LOW HEAT SHRINKAGE
Toshiro Takahashi; Kinsaku Nishikawa, and Masami Takahashi, all of Uji, Japan, assignors to Unitika Limited, Osaka, Japan
Filed Jul. 3, 1989, Ser. No. 375,087
Claims priority, application Japan, Aug. 23, 1988, 63-208656
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—272 2 Claims

1. Polyester yarn which is made from polyethylene tere-

phthalate or from a polyester in which polyethylene terephthalate is the main component, said polyester yarn having the following combination of property characteristics:

(a) an intrinsic viscosity of 0.70 to 1.05 dl/g,
(b) a tenacity of at least 8.0 g/d,
(c) an elongation at break of 17% or less,
(d) an amorphous chain size of 60 to 70 Å,
(e) a density of at least 1.395 g/cm^3,
(f) a dry heat shrinkage of 3.5% or less,
(g) a heat resistance of at least 80%.

4,956,447

RINSE-ADDED FABRIC CONDITIONING COMPOSITIONS CONTAINING FABRIC SOFENING AGENTS AND CATIONIC POLYESTER SOIL RELEASE POLYMERS AND PREFERRED CATIONIC SOIL RELEASE POLYMERS THEREFOR

Eugene P. Gosselink, Cincinnati, Ohio; Frederick E. Hardy, Ponteland, England, and Toan Trinh, Maineville, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 19, 1989, Ser. No. 354,549
Int. Cl.^{5} C08G 63/02
U.S. Cl. 528—272 **25 Claims**

1. Compound useful as cationic polymeric soil release agent having the generic empirical formula:

$$(AO)_x(T)_y(CAT)_z(En)_q(L)_r(FCG)_s$$

wherein:

(I) each (AO) represents an oxyalkyleneoxy group, excluding oxyalkyleneoxy groups of (E_n), containing from 2 to about 6 carbon atoms, and each "x" is from about 1 to about 80.

(II) each (T) represents a terephthaloyl group and each "y" is from about 1 to about 80;

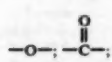
(III) each (CAT) represents a cationic group comprising at least one moiety selected from the group consisting of: $(R)_mN\ (-)_{3-m}$ wherein each "m" is from 0 to 2;

$(R)_mN(-)3\text{-}m$ wherein each "m" is from 0 to 2;

wherein each R group is selected from the group consisting of C_{1-4} alkyl groups, C_{1-4} hydroxyalkyl groups, C_{2-4} alkylene groups, C_{2-4} oxyalkylene groups, phenyl, phenyl C_{1-4} alkyl groups, hydrogen, wherein two R groups can be joined to form cyclic structures, and wherein each $A^{\ominus}$ is any compatible anion, and each "z" is selected from 1 to about 100 to provide the cationic charge to the polymer;

(IV) each (E_n) represents a poly(oxyethylene)oxy group $-(OCH_2CH_2)_qO-$ wherein each "n" is from 2 to about 200, and each q is less than about 25;

(V) each (L), when present, represents a linking group comprising at least one hydrocarbylene group having from 2 to about 4 covalent bonds and containing from one to about 10 carbon atoms and 0 to 4 groups selected from the group consisting of:



and mixtures thereof and each "r" is a number from 0 to about 40; and

(VI) each Formula Completing Group (FCG), when present, is selected from the group consisting of: (a) H—; (b) —OH; (c) C_{1-18} alkyl, alkoxy, or hydroxy alkyl groups, except that when the molecular weight of the compound is above about 10,000, the maximum number of carbon atoms that is in each FCG is about 4; (d) —C(O)OH, and (e) anionic groups neutralized with a compatible cation, and each "s" is a number from to a number sufficient to complete the formula;

and wherein the molecular weight of the compound is less than about 50,000, the net cationic charge of the compound is at least about one per 15,000 molecular weight units and the compound is essentially free of hydrazide groups.

4,956,448

COPOLYESTERS FROM 4,4'-BIPHENYLDICARBOXYLIC ACID, 1,4-CYCLOHEXANEDIMETHANOL, AND 1,4-BUTANEDIOL

John C. Morris, and Winston J. Jackson, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,298
The portion of the term of this patent subsequent to Apr. 10, 2090, has been disclaimed.
Int. Cl.^{5} C08G 63/02
U.S. Cl. 528—272 **18 Claims**

1. A copolyester comprising

(A) an acid component comprising repeating units of at least 80 mol % 4,4'-biphenyldicarboxylic acid, and

(B) a glycol component comprising repeating units of from about 95–20 mol % 1,4-butanediol, and about 5–80 mol % 1,4-cyclohexanedimethanol,

wherein the total mol % of acid component and glycol component are each 100 mol %.

4,956,449

IMMUNOLOGICALLY ACTIVE SYNTHETIC PEPTIDES USEFUL FOR PREPARING AN ANTIMALARIAL VACCINE

Antonio S. Verdini, Monterotondo; Fabio Bonelli, and Antonello Pessi, both of Rome, all of Italy, assignors to Enitricerche, S.p.A., Milan, Italy

Filed Nov. 28, 1988, Ser. No. 276,699
Claims priority, application Italy, Dec. 11, 1987, 22948 A/87
Int. Cl.^{5} C07K 7/10
U.S. Cl. 530—324 **18 Claims**

1. An immunologically active peptide having the formula:

$$H\text{-}(Ala\text{-}Asn\text{-}Asn\text{-}Pro)_n\text{-}OH \qquad (I)$$

wherein

n is an integer of not less than 2.

4,956,450

PROCESS FOR FORMING END-CAPPED POLYAMIC ACIDS POLYIMIDES

Burnell Lee, and Hsueh M. Li, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed May 26, 1989, Ser. No. 357,236
Int. Cl.^{5} C08G 69/26, 8/02
U.S. Cl. 528—353 **16 Claims**

1. A process for preparing a polyamic acid comprising contacting a solution of an aromatic diamine in a suitable solvent with a dianhydride of an aromatic tetracarboxylic acid and a monoanhydride of an aromatic polycarboxylic acid having one free carboxylic acid or esters thereof, said monoanhydride being at least greater than 2.0 mole percent of said diamine and the total mole ratio of said aromatic diamine to said dianhydride and monohydride being about 1:1.

4,956,451

COMPOSITIONS FOR PRODUCTION OF ELECTRONIC COATINGS

Allan A. Eisenbraun, and Wesley C. Blocker, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 11, 1988, Ser. No. 255,260

Int. Cl.[5] C08G *69/26, 12/00;* B05D *3/02, 3/12*

U.S. Cl. 528—353 20 Claims

1. A partially fluorinated polyimide composition especially adapted for use in spin coating wafers of semiconductive materials which composition comprises a solution of (i) a 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride/2,2-bis[4-(aminophenoxy)phenyl]hexafluoropropane polyimide polymer having an inherent viscosity in the range of about 0.05 to about 1.5 dL/g (as measured in N-methylpyrrolidone at room temperature at a concentration of 0.5 g/dL) in (ii) a liquid solvent containing at least 90% of a cycloaliphatic ketone or mixture of cycloaliphatic ketones, such that said solution (a) contains on a weight basis from about 5% to about 50% of such polyimide, and (b) does not undergo precipitate formation during spin coating in an atmosphere of up to at least about 55% relative humidity.

4,956,452

MONOCLONAL ANTIBODY WHICH NEUTRALIZES MULTIPLE STRAINS OF INFECTIOUS BURSAL DISEASE VIRUS

David B. Snyder, Lanham; Warren W. Marquardt, New Carrollton; Sammy L. Gorham, Upper Marlboro, and Dolores P. Lana, Baltimore, all of Md., assignors to The University of Maryland, College Park, Md.

Filed Jun. 12, 1987, Ser. No. 61,083

Int. Cl.[5] C07K *15/14, 15/28;* C12N *15/00;* A61K *39/395*

U.S. Cl. 530—387 5 Claims

1. Hybridomas expressing monoclonal antibodies effective in neutralizing infectious bursal disease virus having the identifying characteristics of the a cell line selected from the group consisting of ATCC HB-9490 and ATCC HB 9437.

4,956,453

ANTI-HUMAN OVARIAN CANCER IMMUNOTOXINS AND METHODS OF USE THEREOF

Michael J. Bjorn, Hercules, Calif.; Arthur E. Frankel, Durham, N.C.; Walter J. Laird, Pinole, Calif.; David B. Ring, Redwood City, Calif., and Jeffrey L. Winkelhake, Alameda, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 806,256, Dec. 6, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 69,720

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.[5] C07K *15/12;* A61K *39/00*

U.S. Cl. 530—389 27 Claims

1. Immunotoxin comprising a cytotoxic moiety and an antigen binding portion selected from the group consisting of the Fab, Fab' and $F(ab')_2$ region of a monoclonal antibody wherein said monoclonal antibody

(i) binds human ovarian cancer tissue;

(ii) has a selectivity of about 0.11 or less;

(iii) is an IgG or IgM;

said immunotoxin having at least one capability selected from the group consisting of:

a cytotoxicity ID_{50} of about 10nM or less against human ovarian cancer cells; retarding the rate of growth of tumors comprised of human ovarian cancer cells carried by a mammal when said mammal is treated with said immunotoxin; or extending the survival time of a mammal bearing a tumor comprised of human ovarian cancer cells when said mammal is treated with said immunotoxin.

4,956,454

MONOCLONAL ANTIBODY - PLATINUM CO-ORDINATION COMPOUND COMPLEX

James G. Heffernan, Pangbourne; Paul C. Hydes, Reading, both of England, and Donald H. Picker, Narbert, Pa., assignors to Johnson Matthey PLC, London, England

Division of Ser. No. 873,130, Jun. 11, 1986, Pat. No. 4,760,155, which is a continuation-in-part of Ser. No. 625,251, Jun. 27, 1984, abandoned. This application Apr. 21, 1988, Ser. No. 184,140

Claims priority, application European Pat. Off., Jun. 11, 1985, 85304131

Int. Cl.[5] C07K *15/12;* A61K *39/00*

U.S. Cl. 530—389 4 Claims

1. A conjugate platinum co-ordination compound/monoclonal antibody complex having the general formula

$$[(M\text{-}Z\text{-}R'NH_2)(RNH_2)PtX_2]$$

in which the X groups are either the same or different and comprise monodentate ligands selected from the class consisting of halogen, pseudohalogen, sulphate, phosphate, nitrate, carboxylate or water, or together comprise a bidentate ligand selected from the class consisting of malonate, cycloalkanedicarboxylate or cycloalkenedicarboxylate ligands, R is selected from the class consisting of hydrogen, lower alkyl, aryl, aralkyl, alkenyl, cycloalkyl or cycloalkenyl, R' is selected from lower alkyl, aryl, alkaryl, aralkyl, alkenyl, cycloalkyl or cycloalkenyl residues, or R and R' together are selected from the class consisting of a methylene or polymethylene, cycloalkyl, cycloalkenyl or aryl residues, and Z is a functionalised polymethylene moiety in which the functionalising group is selected from $—CO_2—$, —O— or —NH—, and M is a monoclonal antibody.

4,956,455

BOVINE FIBROBLAST GROWTH FACTOR

Frederick S. Esch, Oceanside Andrew Baird, San Diego, Calif.; Peter Bohlen, Uster, Switzerland; Denis Gospodarowicz, San Francisco, and Nicholas C. Ling, San Diego, both of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.

abandoned, which is a continuation-in-part of Ser. No. 670,160, Nov. 9, 1984, abandoned. This application Jun. 20, 1985, Ser. No. 747,154

Int. Cl.[5] C07K *15/06*

U.S. Cl. 530—399 7 Claims

1. Substantially pure basic fibroblast growth factor containing the amino acid sequence:

Pro—Al—Leu—Pro—Glu—Asp—Gly—Gly—Ser—Gly—
Ala—Phe—Pro—Pro—Gly—His—Phe—Lys—Asp—Pro—
Lys—Arg—Leu—Tyr—Cys—Lys—Asn—Gly—Gly—Phe—
Phe—Leu—Arg—Ile—His—Pro—Asp—Gly—Arg—Val—
Asp—Gly—Val—Arg—Glu—Lys—Ser—Asp—Pro—His—
Ile—Lys—Leu—Gln—Leu—Gln—Ala—Glu—Glu—Arg—
Gly—Val—Val—Ser—Ile—Lys—Gly—Val—Cys—Ala—
Asn—Arg—Tyr—Leu—Ala—Met—Lys—Glu—Asp—Gly—
Arg—Leu—Leu—Ala—Ser—Lys—Cys—Val—Thr—Asp—
Glu—Cys—Phe—Phe—Phe—Glu—Arg—Leu—Glu—Ser—
Asn—Asn—Tyr—Asn—Thr—Tyr—Arg—Ser—Arg—Lys—
Tyr—Ser—Ser—Trp—Tyr—Val—Ala—Leu—Lys—Arg—
Thr—Gly—Gln—Tyr—Lys—Leu—Gly—Pro—Lys—Thr—
Gly—Pro—Gly—Gln—Lys—Ala—Ile—Leu—Phe—Leu—
Pro—Met—Ser—Ala—Lys—Ser.

4,956,456

BETAINE-TYPE CYAN MONOAZO DYES FOR DYING AND PRINTING FIBROUS MATERIALS

Masaaki Tsukase, and Kozo Sato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 135,202, Dec. 21, 1987, abandoned. This application Dec. 1, 1989, Ser. No. 442,500
Claims priority, application Japan, Dec. 19, 1986, 61-302894
Int. Cl.[5] C09B *44/02*; D06P *1/41, 3/24, 3/79*
U.S. Cl. 534—615 13 Claims

1. A betaine-type monoazo dye represented by formula (I):

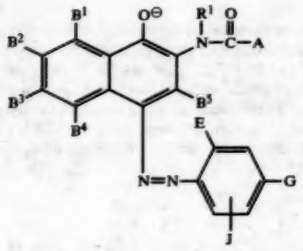
Dye—x—y (I)

wherein Dye represents a cyan dye anion represented by formula (II);

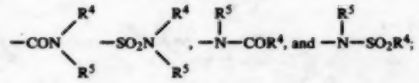
X represents a bond or linking group;

Y represents quaternary ammonium; and

Dye and X are bonded to each other via A, B^1, B^2, B^3, B^4 or B^5 in formula (II):



wherein B^1, B^2 B^3, B^4 and B^5 are the same or different, and each represents a member selected from the group consisting of a bond, hydrogen, alkyl halogen, $—OR^4$, $—CO_2R^4$,



wherein R^4 and R^5 are the same or different and each represents a member selected from the group consisting of hydrogen, alkyl and aryl, or R^4 and R^5 are taken together to form a 5- or 6- membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms;

A represents a member selected from the group consisting of hydrogen, alkyl, aryl, cycloalkyl, a 5- or 6-membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms and

wherein A^2 and A^3 have the same meaning as A, or A^2 and A^3 are bonded to each other to form a 5- or 6-membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms;

E represents a member selected from the group consisting of hydrogen, halogen, cyano, hydroxyl, carboxyl, alkyl aryl, a 5-or 6-membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms, alkoxy, aryloxy, alkylthio. arylthio, carbacylamino. sulfonylamino, carbamoyl, amino, alkylsulfonyl and phenylsulfonyl;

G represents a member selected from the group consisting of cyano, alkylsulfonyl and phenylsulfonyl;

J represents a member selected from the group consisting of hydrogen, halogen, cyano, alkylsulfonyl and phenylsulfonyl; and

R^1 represents a member selected from the group consisting of hydrogen and alkyl.

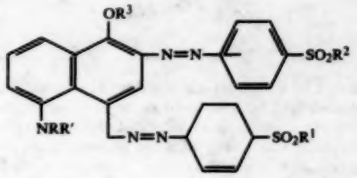
4,956,457

DISAZO DISULFONAMIDES COMPOUNDS

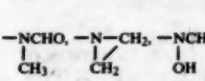
Takeo Takayanagi, 41 Ellsworth Ave., Yonkers, N.Y. 10705

Division of Ser. No. 876,834, May 20, 1986, Pat. No. 4,863,910. This application Aug. 10, 1989, Ser. No. 391,945
Int. Cl.[5] C07C *107/00, 107/04, 107/06, 107/08*
U.S. Cl. 534—643 2 Claims

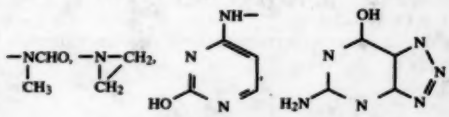
1. An azo compound of the formula



wherein R and R' are selected from the group consisting of hydrogen, $—COCR_3^4$, $—COCHR_2^4$, $—SO_2CH_3$, $—CO_2C_2H_5$, $—CH_2CH_2R^4$, $—(CH_2CH_2R^4)_2$, $—CH_2CH_2OH$, $—CONHCH_2CH_2R^4$ and $—CH_2CH_2OCONH_2$, R^4 is selected from the group consisting of chlorine,



$—NHCO_2CH_2CH_2OH$, $—HNCO_2C_2H_5$, —NHOH, —NHCONHOH and $—NHCH_3$; R^1 and R^2 are individually selected from the group consisting of



$—NHCH_2CH_2Cl$, —NHCONHOH, $—NHCO_2C_2H_5$, 6-mercapropurin, 5-fluoruracil and prenissolin, R^3 is selected from the group consisting of hydrogen, $—COCHR_2^4$, $—SO_2CH_3$, $—COC_2H_5$, $—CH_2CH_2R_4$ and $—CONH_2$, R^4 is the same as defined hereinabove or their salts.

4,956,458

PURIFICATION OF POLYDEXTROSE BY REVERSE OSMOSIS

Shiuh J. Luo, Morris Plains; Frank J. Bunick, Budd Lake, and Robert H. Graf, Randolph, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 13, 1988, Ser. No. 193,961
Int. Cl.[5] C08B *37/02*; C07H *1/06, 1/08*
U.S. Cl. 536—112 13 Claims

2. A purified polydextrose product, which comprises a commercially available polydextrose purified by pressing an aqueous solution of said polydextrose along a reverse osmosis system to provide a purified polydextrose solution and recycling said purified polydextrose solution (retentate) to provide a purified polydextrose solution containing less than about 0.2%

1,6-anhydroglucose and less than about 0.01% hydroxymethylfurfural.

4,956,459

PLATINUM COMPOUNDS SUITABLE FOR USE AS PHARMACEUTICALS

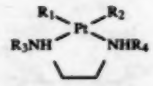
Abdolhossen Talebian, Herndon; Dianna C. Green, Falls Church, both of Va.; Charles F. Hammer, Washington, D.C., and Philip S. Schein, Bryn Mawr, Pa., assignors to Georgetown University, Washington, D.C.

Continuation-in-part of Ser. No. 74,600, Jul. 17, 1987, abandoned. This application Jan. 14, 1988, Ser. No. 143,763

Int. Cl.[5] A61K *31/28, 31/70*; C07H *23/00*

U.S. Cl. 536—121 **9 Claims**

1. A compound of the formula:



wherein each of R_1 and R_2 is independently selected from the group consisting of halogen, hydroxy, or mono carboxylic acid or R_1 and R_2 together is a multifunctional carboxylic acid residue which forms a ring with the platinum atom through two oxygens of said multifunctional carboxylic acid; R_3 is a deoxy mono or disaccharide or a derivative thereof; and R_4 is selected from the group consisting of hydrogen, C_{1-4}-alkyl, phenyl, benzyl, substituted phenyl or substituted benzyl, wherein substituents are selected from the group consisting of halogen, nitro, C_{1-2}-alkoxy, carboxy, carbonyl ester or phenyl or a pharmaceutically acceptable salt thereof.

4,956,460

PROCESS FOR THE PREPARATION OF 1-ALKYL-3-CARBOXY-4-CINNOLONES

Raffaello Fusco; Fulvio L. Piselli, and Pier M. Boschi, all of Milan, Italy, assignors to Industria Chimica Profarmaco S.P.A., Milan, Italy

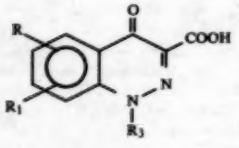
Filed Mar. 23, 1988, Ser. No. 172,072

Claims priority, application Italy, Apr. 23, 1987, 20230 A/87

Int. Cl.[5] C07D *237/28, 491/056*

U.S. Cl. 544—234 **6 Claims**

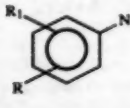
1. A process for the preparation of a cinnolone of formula I



I

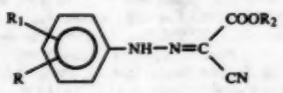
wherein R and R_1, which may be the same or different, are hydrogen, alkoxy, alkylthio or, taken together, are methylenedioxy R_3 is C_1–C_6 alkyl or C_3–C_6 cycloalkyl which process comprises;

(a) diazotization of a compound of formula II



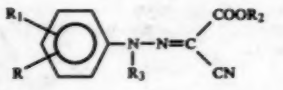
II

wherein R and R_1 are as above defined with an alkali nitrite in an acid medium suitable for diazotrization, followed by reaction with a cyanoacetric acid ester of formula $CN—CH_2—COOR_2$ (R_2=C_1-C_4 alkyl), to give a compound of formula III



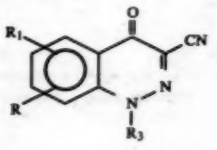
III

(b) alkylation of the compound of formula III with an alkylating agent R_3X (X = halogen or sulfate and R_3 is the same as defined above in the presence of a base selected from alkali hydroxides and carbonates and a polar aprotic solvent at a temperature of 10°–100° C. to give an ester of formula IV



IV

(c) hydrolysis of the ester of formula IV to carboxylic acid with an alkali hydroxide in a water miscible solvent at a temperature of 0°–80° C., chlorination of the carboxylic acid to acyl chloride with a chlorinating agent in an inert solvent, and intramolecular cyclization of the acyl chloride in an inert solvent at a temperature of 100°–150° C. and in the absence of catalyst to give a compound of formula VII



VII

and

(d) acid hydrolysis of the compound of formula VII to the compound of formula I.

4,956,461

DESAMINO-AMINOPTERIN AND -METHOTREXATE

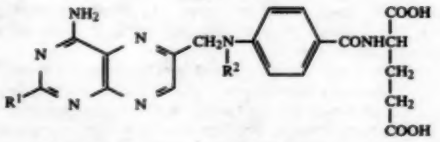
Andre Rosowsky, Needham, Mass., assignor to Dana Farber Cancer Institute, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 259,859, Oct. 19, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,077

Int. Cl.[5] C07D *475/06*

U.S. Cl. 544—258 **5 Claims**

1. A compound having the structure



in which R_1 is hydrogen or a lower alkyl group and R_2 is hydrogen or methyl.

4,956,462

"TRIAZOLO-PYRIMIDINE INTERMEDIATES"

Shigeo Shimizu, and Hiroyuki Takano, both of Mukawa, Japan, assignors to Sankei Pharmaceutical Co., Ltd., Tokyo and Nippon Pharmaceutical Development Institute Co., Ltd., Hokkaido, both of, Japan

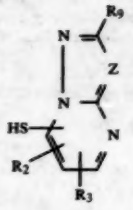
Division of Ser. No. 222,404, Jul. 21, 1988. This application May 26, 1989, Ser. No. 357,124

Claims priority, application Japan, Aug. 7, 1987, 62-196178

Int. Cl.[5] C07D *487/04*; A61K *31/505*

U.S. Cl. 544—263 3 Claims

1. A compound represented by the formula (VII'):



(VII')

where at least one of R_2, $R_3$and R_9 represent a group represented by the formula: —A—OR_4 where R_4 represents a hydrogen or a lower alkyl group; and A represents a straight or branched alkylene group having 1 to 6 carbon atoms; and a remaining group or groups are each independently a hydrogen atom; a cyano group; a lower alkyl group which may be substituted by a halogen atom; a carbamoyl group which may be substituted by a lower alkyl group; a cycloalkyl group; or a carboxyl group which may be substituted by a protective group or an eliminatable group which is easily hydrolyzable in a human body, and also when R_9 is —A—OR_4, R_2 and R_3 may be combined with each other to form an alkylene group having 3 to 4 carbon atoms; Z represents a nitrogen atom or a group represented by the formula: C—R_{10} where R_{10} represents a hydrogen atom, a carboxyl group or a lower alkyl group which may be substituted by a hydroxy group or a lower alkoxy group; and X represents a hydrogen atom, a lower alkyl group, a lower alkoxy group or a halogen atom.

4,956,463

PYRIMIDONE COMPOUND AND PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Fujio Nohara, Takaoka, Japan, assignor to Ikeda Mohando Company, Ltd., Toyama, Japan

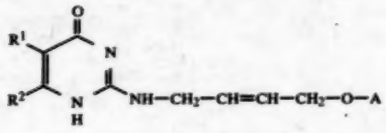
Filed Dec. 7, 1988, Ser. No. 281,040

Claims priority, application Japan, Dec. 7, 1987, 62-309293

Int. Cl.[5] C07D *239/47*, *401/12*, *401/14*, *403/12*

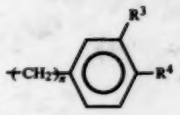
U.S. Cl. 544—320 11 Claims

1. A pyrimidone compound represented by the formula (I) or a pharmaceutically acceptable salt thereof:

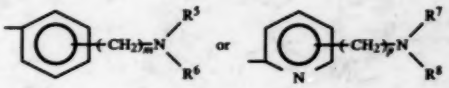


(I)

wherein R^1 and R^2 each represents a linear or branched alkyl group having 1 to 12 carbon atoms or a group represented by the formula:



wherein n is an integer of 1 to 3 and R^3 and R^4 each represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms or a methylenedioxy group; and A represents a group having the formula:



wherein m and p each represents an integer of 1 to 3; and R^5 to R^8 each represents a hydrogen atom or a linear or branched alkyl group having 1 to 6 carbon atoms, or —NR^5R^6 and —NR^7R^8 each represents a group of the formula:

wherein q is an integer of 4 to 6.

4,956,464

PREPARATION OF DIHYDROQUINACRIDONES, QUINACRIDONES AND QUINACRIDONEQUINONES

Herbert Bender, Boehl-Iggelheim; Horst Colberg, Ludwigshafen; Friedhelm Teich, Karlsruhe, and Reinhard Kemper, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

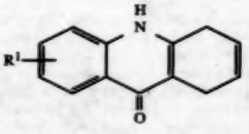
Filed Oct. 27, 1988, Ser. No. 263,355

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736261; Apr. 22, 1988, 3813625

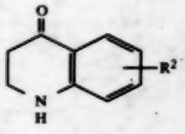
Int. Cl.[5] C09B *48/00*

U.S. Cl. 546—57 7 Claims

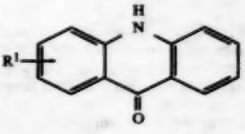
1. A process for preparing a dihydroquinacridone of the formula:



(I)

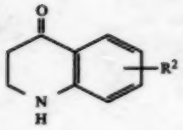


a quinacridone of the formula II:

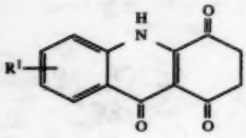


(II)

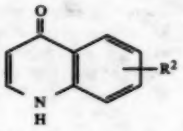
-continued



a quinacridonequinone of the formula III:

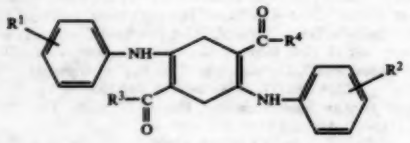


(III)



or a mixture thereof, wherein R^1 and R^2 in the formulae I, II and III are identical or different and each is independently of the other hydrogen, chlorine, bromine, C_1–C_{10}-alkoxy, C_1–C_{10}-alkyl or substituted or unsubstituted phenyl, wherein

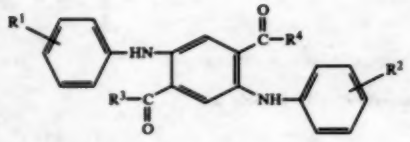
(a) to prepare a dihydroquninacridone of formula I, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of the formula IV



(IV)

where R^1 and R^2 each have the above-mentioned meanings and R^3 and R^4 are identical or different and are each independently of the other C_1–C_{10}-alkoxy, amino, C_1–C_{10}-mono or -dialkylamino or halogen, is cyclized at a temperature of from 350° to 500° C. for a time of from 0.1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phases,

(b) to prepare a quinacridone of formula II, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of formula Iv is cyclized and dehydrogenated at a temperature of from 400° to 700° for a time of from 1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase or a 2,5-dianilinoterephthalic acid derivative of the formula V



(V)

where R^1, R^2, R^3 and R^4 each have the above-mentioned meanings, is cyclized at a temperature of from 350° to 550° C. for a time of from 0.1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase; and

(c) to prepare a quinacridonequinone of formula III, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of formula IV or a 2,5-dianilinoterephthalic acid derivative of formula V is cyclized at a temperature of from 300° to 700° C. for a time of from 0.5 to 10 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase in the presence of an oxidizing agent.

4,956,465

QUINOLONE- AND 1,8-NAPHTHYRIDIN-4-ONE-CARBOXYLIC ACIDS WHICH ARE C-BONDED IN THE 7-POSITION

Michael Schriewer; Klaus Grohe, both of Odenthal, and Uwe Petersen, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

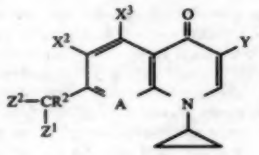
Filed Oct. 3, 1988, Ser. No. 252,631

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734161; Apr. 2, 1988, 3811341

Int. Cl.[5] C07D 215/56

U.S. Cl. 546—156 **5 Claims**

1. A quinolone carboxylic acid or 1,8-naphthyridin-4-onecarboxylic acid of the formula



in which

Y is cyano or a —COO—C_1–C_4-alkyl group,

X^2 and X^3 each independently is hydrogen, chlorine or fluorine,

A is the radical C—X^4, where

X^4 is hydrogen, chlorine or fluorine

R^2 is hydrogen or C_1–C_3-alkyl, and

Z^1 is alkoxy-carbonyl having 1–4 carbon atoms in the alcohol part or hydrogen and Z^2 is cyano or alkoxy-carbonyl having 1–4 carbon atoms in the alcohol part.

4,956,466

THIAZOLE DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Antonio B. Vinas, Barcelona, Spain, assignor to Laboratorios Vinas, S. A., Barcelona, Spain

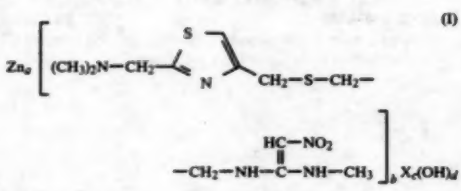
Filed May 23, 1989, Ser. No. 356,014

Claims priority, application Spain, Jul. 11, 1988, 8802172

Int. Cl.[5] C07F 3/06

U.S. Cl. 548—101 **3 Claims**

1. Thiazole derivatives of the general formula I:



(I)

where:

X is an anion of pharmaceutically acceptable acids;

a is an integer from 1 to 5;

b is an integer from 1 to 7;

c is 0 or an integer from 1 to 4; and

d is $2a-c$ for monovalent acid anions, is a−c for divalent acid anions, and is 0 or 2 when c=0.

4,956,467

NUCLEOPHILIC TERTIARY ORGANOPHOSPHINES

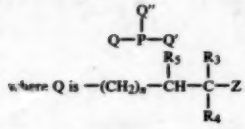
Lois M. Hinman, North Tarrytown, and Libby S. Miller, New York City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 176,571, Apr. 1, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 333,803

Int. Cl.[5] C07F 9/50, 9/572, 9/58, 9/6506

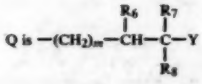
U.S. Cl. 548—112 **7 Claims**

1. Tertiary phosphines selected from compounds and formula.



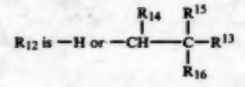
wherein Q is $-(CH_2)_n-CH(R_5)-C(R_3)(Z)-R_4$

Q′ is Q or Q″



Y and Z are $-NR_{10}R_{11}$ or $-OR_{12}$;

R_{10} and R_{11} taken with the N form imidazolyl, pyrrolidonyl, pyridyl or morpholinyl rings



R_{12} is −H or $-CH(R_{14})-C(R_{15})(R_{13})-R_{16}$

R_{13} is $[CH(R_{17})]_t-OH$

where n,m and t are independently 0–3;

R_3, R_4, R_5, R_6, R_7, R_8, R_{14} and R_{15} are independently H or alkyl (C_1–C_4);

R_{16}—R_{17} are independently —H or OH; with the proviso that Y and Z are not the same for any given compound.

4,956,468

PROCESS FOR THE ACYLATION OF THIAZOLIDINES

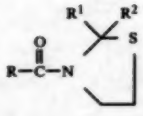
Nancy Kerlinger, Lafayette, and Richard D. Gless, Oakland, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Continuation of Ser. No. 270,913, Nov. 14, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 405,114

Int. Cl.[5] C07D 277/04

U.S. Cl. 548—200 **9 Claims**

1. A process for the manufacture of a compound having the formula



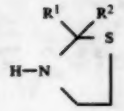
(I)

wherein

R is haloalkyl,

R^1 is hydrogen or lower alkyl, and

R^2 is hydrogen or lower alkyl; which process comprises treating a compound having the formula



(II)

wherein R^1 and R^2 are defined above, which an acyl halide of the formula

(III)

wherein X is a halogen atom and R is as defined above, in the presence of a buffer selected from the group of salts of weak bases and acid, wherein said buffer is present in an amount of from about 50 to about 250 mold percent based on the amount of Compound (II) to maintain a pH of from about 5 to about 12, at a temperature of from about 0° C. to about 15° C.

4,956,469

PREPARATION OF SUBSTITUTED TETRAZOLINONES

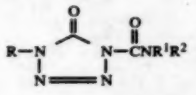
Rupert A. Covey, Bethany; Patricia J. Forbes, Waterbury; Allyn R. Bell, and Allen R. Blem, both of Cheshire, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Division of Ser. No. 737,371, May 23, 1985, Pat. No. 4,826,529, which is a continuation of Ser. No. 560,031, Dec. 9, 1983, Pat. No. 4,618,365. This application Jan. 10, 1989, Ser. No. 283,109

Int. Cl.[5] C07D 257/04

U.S. Cl. 548—251 **3 Claims**

1. A process for making a compound having the formula:



wherein

R is:

C_1–C_{12} alkyl,

C_2–C_{13} alkoxyalkyl,

C_7–C_9 aralkyl,

C_5–C_6 cycloalkyl,

C_3–C_{12} alkenyl,

naphthyl,

phenyl,

phenyl substituted with at least one member selected from the group consisting of:

fluorine,

chlorine,

bromine,

iodine,

C_1–C_4 alkyl,

C_1–C_4 alkoxy,

methylenedioxy,

NR^3R^4 wherein R^3 and R^4 are the same or different and are hydrogen or C_1–C_6 alkyl,

C_2–C_5 alkoxycarbonyl,

carboxy,

phenoxy,

nitro,

cyano,

trihalomethyl wherein halo is fluorine, chlorine or bromine,

trihalomethoxy wherein halo is fluorine, chlorine or bromine,

C_1–C_6 alkylthio, and

C_1–C_6 fluoroalkylthio; or

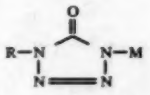
benzyl substituted with at least one member selected from the group consisting of:
fluorine,
chlorine,
bromine,
iodine,
C_1–C_4 alkyl,
C_1–C_4 alkoxy,
methylenedioxy,
C_2–C_5 alkoxycarbonyl,
phenoxy,
nitro,
cyano,
trihalomethyl wherein halo is fluorine, chlorine or bromine,
trihalomethoxy wherein halo is fluorine, chlorine or bromine,
C_1–C_6 alkylthio, and
C_1–C_6 fluoroalkylthio;

R^1 and R_2 are the same or different and are
C_1–C_6 alkyl,
C_3–C_6 alkenyl,
C_5–C_6 cycloalkyl,
C_7–C_9 aralkyl,
C_7–C_9 aralkyl substituted with at least one member selected from the group consisting of:
fluorine,
chlorine,
bromine,
iodine,
C_1–C_6 alkyl,
C_1–C_2 haloalkyl wherein halo is fluorine, chlorine or bromine,
halomethoxy wherein halo is fluorine, chlorine or bromine,
C_1–C_6 alkoxy,
C_1–C_6 alkylthio,
C_1–C_6 fluoroalkylthio,
phenoxy,
phenylthio,
carboxy,
C_2–C_5 alkoxycarbonyl,
methylenedioxy,
nitro,
cyano, and
NR^7R^8 wherein R^7 and R^8 are the same or different and are hydrogen, C_1–C_6 alkyl, C_4–C_8 alkylene or C_4–C_8 oxydialkylene;
naphthyl,
phenyl, or
phenyl substituted with at least one member selected from the
group consisting of:
fluorine,
chlorine,
bromine,
iodine,
C_1–C_6 alkyl,
C_1–C_2 haloalkyl wherein halo is fluorine, chlorine or bromine;
halomethoxy wherein halo is fluorine, chlorine or bromine,
C_1C_6 alkoxy,
C_1–C_6 alkylthio,
C_1–C_6 fluoroalkylthio,
phenoxy,
phenyl,
phenylthio,
carboxy,
C_2–C_5 alkoxycarbonyl,
C_1–C_2 alkylenedioxy, optionally substituted with 1–2 methyl groups,
C_1–C_2 alkyleneoxy, optionally substituted with 1–2 methyl groups,
nitro,
cyano, and
NR^7R^8 wherein R^7 and R^8 are the same or different and are hydrogen, C_1–C_6 alkyl, C_4–C_8 alkylene or C_4–C_8 oxydialkylene; or

R^1 and R_2 together are C_4–C_8 alkylene or C_4–C_8 oxydialkylene,

with the proviso that when R is other than C_3–C_{12} alkenyl, C_1–C_6 alkylthio-substituted phenyl, C_1–C_6 alkylthio-substituted benzyl, C_1–C_6 fluoroalkylthio-substituted phenyl or benzyl and wherein at least one of R^1 and R_2 is C_7–C_9 aralkyl, C_7–C_9 substituted aralkyl phenyl or substituted phenyl, wherein substitution is as indicated above,

comprising: the step of reacting, in an inert solvent at a temperature range from about 40° C. up to the boiling point of said solvent a tetrazolinone compound having the formula:



wherein R has the meanings given above and wherein M is hydrogen with an alkali metal carbonate to form an intermediate of the formula above wherein M is Li, Na or K followed by the reaction of said intermediate with a carbamoyl halide having the formula $XCONR^1R^2$, wherein X is chlorine or bromine and R^1 and R_2 have the meanings above.

4,956,470

1,3-DISUBSTITUTED/IMIDAZOLIUM SALTS

Wilhelm Klötzer, Innsbruck, Austria; Helmut Link, Basel, Switzerland; Renate Müssner, Innsbruck, Austria; Werner Schiestl, Innsbruck, Austria, and Nicolas Singewald, Innsbruck, Austria, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

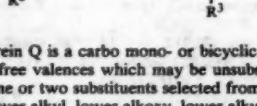
Division of Ser. No. 46,473, May 4, 1987, Pat. No. 4,814,332. This application Jan. 9, 1989, Ser. No. 295,165

Claims priority, application Switzerland, May 13, 1986, 1940/86

Int. Cl.[5] C07D *413/06*

U.S. Cl. 548—337 **3 Claims**

1. A compound of the formula



V

wherein Q is a carbo mono- or bicyclic aromatic group with two free valences which may be unsubstituted or substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, trifluoromethyl, hydroxy, nitro and cyano, the group $—NR^1R^2$ is a basic amino group represented by the formula —NRR′ in which R is hydrogen or lower alkyl and R′ is a saturated lower hydrocarbon group which is unsubstituted or substituted by one or two lower alkoxy or hydroxy groups or by an amino, lower alkylamino, lower dialkyamino, oxo, lower alkoxycarbonyl or lower alkylenedioxy group, R^3 is lower alkylthio, lower alkoxy or the group $—(A)_n—Ra$, n is the integer 0 or 1, A is vinylene or lower alkylene, Ra is a carbo mono- or bicyclic aromatic group which may be unsubstituted or substituted by one, two or three substituents selected from the group consisting of di(lower alkyl)amino, lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, hydroxy, trifluoromethyl, nitro and cyano, or a basic

amino group represented by the formula —NRR′ in which R is hydrogen or lower alkyl and R′ is a saturated lower hydrocarbon group which is unsubstituted or substituted by one or two lower alkoxy or hydroxy groups or by an amino, lower alkylamino, lower dialkyamino, oxo, lower alkoxycarbonyl or lower alkylenedioxy group, R^5 is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower haloalkyl, a carbo mono- or bicyclic aromatic group which may be unsubstituted or substituted by one, two or three substituents selected from the group consisting of di(lower alkyl)amino, lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, hydroxy, trifluoromethyl, nitro and cyano or a fused benzene ring and R^6 is hydrogen or lower alkyl.

4,956,471

PROCESS FOR ISOLATING AND PURIFYING AMINO ACIDS

Hisao Ito; Akio Nishi; Masasi Miyazawa, and Masayoshi Naruse, all of Kawasaki, Japan, assignors to Ajinomoto Company, Inc., Tokyo, Japan

Continuation of Ser. No. 238,529, Aug. 31, 1988, abandoned. This application May 16, 1989, Ser. No. 355,821

Claims priority, application Japan, Apr. 28, 1986, 61-98512; Apr. 28, 1986, 61-98513; May 23, 1986, 61-118867; Jun. 11, 1986, 61-135517; Jun. 20, 1986, 61-144260

Int. Cl.[5] C07D *233/64;* C07C *99/12*

U.S. Cl. 548—344 **5 Claims**

1. A process for isolating and purifying an amino acid by ion-exclusion chromatography, which comprises:

(a) introducing an aqueous solution containing an amino acid to be purified, selected from the group consisting of histidine, threonine, valine, arginine, glutamine and isoleucine, into a column having packed therein a strongly acidic exchange resin, wherein said exchange resin is of the same cation type as the predominant cation exiting in the feed solution, and wherein said resin has a crosslinking degree of 4–8%, and

(b) adding an aqueous solution to the column to pass through impurities originally contained in the aqueous solution containing the amino acid, and then passing through the purified amino acid, and wherein the flow rate of the elution liquid ranges from 0.5 to 4 SV, and wherein the pH of said aqueous solution for elution is adjusted to the isoelectric pH±1 pH unit of the amino acid to be purified, before being introduced into said column, and

wherein said impurities for isoleucine, threonine, valine and histidine are composed mainly of at least one member selected from the group consisting of acidic amino acids, sulfate ions, chloride ions and pigments, and the same ion as is adsorbed in said resin;

and wherein said impurities for arginine are composed mainly of at least one member selected from the group consisting of lysine, ornithine, citrulline, histidine, sulfate ions, chloride ions and pigments, and the same ions as is adsorbed in said resin;

and wherein said impurities for glutamine are composed mainly of at least one member selected from the group consisting of glutamic acid, pyrrolidone, carboxylic acid and sulfate ions, and the same ion as is adsorbed in said resin.

4,956,472

ORGANOSILICON OXYGEN BLEACH ACTIVATORS

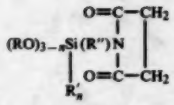
Sunny J. Lo, Midland; Terence J. Swihart, Bay City, and Andrew H. Ward, Sanford, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 234,661, Aug. 19, 1988, Pat. No. 4,906,399. This application Feb. 6, 1990, Ser. No. 475,500

Int. Cl.[5] C07F *7/04, 7/18*

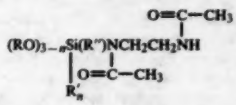
U.S. Cl. 548—406 **4 Claims**

1. A compound having the formula:



wherein R=an alkyl group having 1–4 carbon atoms, R′=an alkyl group having 1–4 carbon atoms, R″=an alkylene group having 1–6 carbon atoms, and n=0, 1, or 2.

2. A compound having the formula:



wherein R=an alkyl group having 1–4 carbon atoms, R′=an alkyl group having 1–4 carbon atoms, R″=an alkylene group having 1–6 carbon atoms, and n=0, 1, or 2.

4,956,473

2-AZA-4-(ALKOXYCARBONYL)SPIRO[4,5]DECAN-3-ONE

Hans P. Mettler, Brig-Glis; Gareth Griffiths, Visp; Lester Mills, Naters, and Felix Previdoli, Brig, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

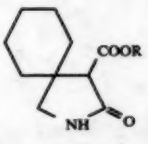
Filed Aug. 30, 1989, Ser. No. 400,820

Claims priority, application Switzerland, Sep. 1, 1988, 3272/88; Apr. 12, 1989, 1382/89; Apr. 12, 1989, 1383/89

Int. Cl.[5] C07D *209/54;* C07C *255/46;* C07B *43/06*

U.S. Cl. 548—408 **3 Claims**

1. 2-Aza-4-(alkoxycarbonyl)spiro[4,5]-decan-3-one of the formula:



(I)

wherein R is a lower alkyl radical of 1 to 4 C atoms.

4,956,474

INTERMEDIATES OF CEPHALOSPORIN COMPOUNDS

Haruo Ohnishi, Funabashi; Hiroshi Kosuzume, Mishima; Masahiro Mizota, Gotenba; Yasuo Suzuki, Kawaguchi, and Ei Mochida, Tokyo, all of Japan, assignors to Mochida Pharmaceutical Co., Ltd., Tokyo, Japan

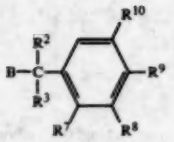
Continuation of Ser. No. 174,518, Mar. 28, 1988, Pat. No. 4,904,791, which is a division of Ser. No. 838,309, Mar. 10, 1986, Pat. No. 4,804,945. This application Jun. 20, 1989, Ser. No. 368,846

Claims priority, application Japan, Apr. 1, 1985, 60-68866; May 17, 1985, 60-105704; Jul. 4, 1985, 60-147359; Jul. 27, 1985, 60-166259

Int. Cl.[5] C07C *239/20;* C07D *209/48*

U.S. Cl. 548—475 **8 Claims**

1. An intermediate compound in the synthesis of cephalosporin derivatives, represented by the formula (XV):



(XV)

or salts, solvates or salts of solvates thereof, wherein B represents a phthalimidooxy group or an aminoxy group, R^2 represents a hydrogen atom or a methyl group, R^3 represents a carboxyl group or a protected carboxyl group, R^7 represents a hydrogen atom, a carboxyl group, a protected carboxyl group, an isopropyl group, a hydroxy group, a methoxy group or an acetoxy group, R^8 and R^9 are the same or different and represent hydrogen atoms, hydroxy groups, methoxy groups, ethoxy groups, 2-methoxyethoxymethoxy groups, acetoxy groups, chloroacetoxy groups, butanoyloxy groups, methanesulfonyloxy groups, p-toluenesulfonyloxy groups, amino groups, acetamino groups, benzyloxycarbonylamino groups, methanesulfonyl groups, or together an ethylendioxy group or a carbonyldioxy group, R^{10} represents a hydrogen atom, a hydroxy group, an acetoxy group, a methoxy group, or a chloroacetoxy group, with the proviso that R^7, R^8, R^9 and R^{10} do not represent hydrogen atoms at the same time.

4,956,475

PREPARATIONOF ENANTIOMERICALLY PURE 3-PROTECTED AMINO-PYRROLIDINES

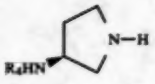
Daniel T. Chu, Vernon Hills, Ill., and Terry J. Rosen, East Lyme, Conn., assignors to Abbott Laboratories, Abbott Park, Ill.

Division of Ser. No. 167,058, Mar. 11, 1989, Pat. No. 4,859,776. This application May 25, 1989, Ser. No. 356,970

Int. Cl.[5] C07D *207/14*

U.S. Cl. 548—557 **9 Claims**

1. A process for the preparation of the enantiomerically pure (S) form of a compound having the formula:



wherein R_4 is a nitrogen protecting group, the process comprising:

(a) transforming the hydroxyl group of a N-1 protected enantiomerically pure (R)-3-hydroxypyrrolidine into a leaving group;

(b) introducing a nitrogen containing substituent by displacing the leaving group with a nitrogen nucleophile that is a precursor to an amino;

(c) converting the nitrogen nucleophile to an amine, which is then protected with a nitrogen protecting group R_4 that is stable under the conditions required to cleave the N—1 protecting group; and

(d) cleaving the N—1 protecting group.

4,956,476

PREPARATION OF THIOLACTAMS

Alan D. Eastman; Marvin M. Johnson, and Richard D. Skinner, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 1, 1990, Ser. No. 486,709

Int. Cl.[5] C07D *201/02, 207/267, 211/76, 223/02*

U.S. Cl. 548—552 **15 Claims**

1. In a process for catalytically reacting at least one lactam with hydrogen sulfide so as to produce at least one thiolactam, the improvement which comprises employing a catalyst consisting essentially of alumina.

7. In a process for reacting N-methyl-2-pyrrolidone with hydrogen sulfide so as to produce N-methyl-2-thiopyrrolidone, the improvement which comprises employing a catalyst consisting essentially of alumina.

4,956,477

SYNTHESIS OF 1,2-DIOXETANES

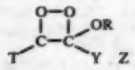
Irena Y. Bronstein, Newtown, and Brooks Edwards, Cambridge, both of Mass., assignors to Tropix, Inc., Bedford, Mass.

Division of Ser. No. 367,772, May 15, 1989, which is a continuation-in-part of Ser. No. 140,197, Dec. 31, 1987, abandoned. This application Sep. 22, 1989, Ser. No. 411,387

Int. Cl.[5] C07D *321/00*; C07F *9/653*

U.S. Cl. 549—221 **25 Claims**

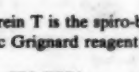
1. A process for producing a 1,2-dioxetane compound having the formula:



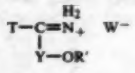
in which T is a spiro-bonded stabilizing group that prevents the dioxetane compound from decomposing before the bond between Y and Z is intentionally cleaved, Y is an aromatic, light-emitting fluorophore-forming fluorescent chromophore group capable of absorbing energy to form an excited energy state from which it emits optically detectable energy to return to its original energy state, Z is hydrogen, a chemically cleavable group or an enzyme-cleavable group, and R is a C_1–C_{20} unbranched or branched, substituted or unsubstituted, saturated or unsaturated alkyl group; a heteroalkyl group or aralkyl group; a substituted or unsubstituted polynuclear or heteropolynuclear aralkyl group; a saturated or unsaturated cycloalkyl group; an N, O or S heteroatom-containing group; or an enzyme-cleavable group; with one or more of T, Y, Z or R being substituted with a group that enhances the water solubility of the 1,2-dioxetane or unsubstituted with such a group, which comprises: reacting a nitrile having the formula:

wherein T is the spiro-bonded stabilizing group, with an aromatic Grignard reagent having the formula:

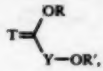
wherein X is a halogen and R' is a substituent as defined for R hereinabove, and acidifying the thus-obtained reaction product with an acid HW, wherein W is the acid's anion, to form the corresponding ketimine salt having the formula:



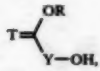
reacting the ketimine salt with an aqueous alcoholic acid to form the corresponding ketone having the formula:



reacting the ketone with base plus an R-ylating agent to form the corresponding enol ether having the formula:



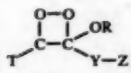
selectively deetherifying the enol ether to form the corresponding monohydroxy enol ether having the formula:



converting the hydroxy group in the monohydroxy enol ether to a Z group to form the corresponding enol ether having the formula:

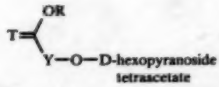
and oxygenating the T=C double bond in this enol ether to give the corresponding 1,2-dioxetane compound.

23. A process for producing a 1,2-dioxetane compound having the formula:



wherein T is a polycycloalkylidene group, R is a C_1–C_{20} unbranched or branched, substituted or unsubstituted, saturated or unsaturated alkyl group; a heteroalkyl group or aralkyl group; a substituted or unsubstituted polynuclear or heteropolynuclear aralkyl group; a saturated or unsaturated cycloalkyl group; an N, O or S heteroatom-containing group; or an enzyme-cleavable group; Y is an aromatic, light-emitting fluorophore-forming fluorescent chromophore group capable of absorbing energy to form an excited energy state from which it emits optically detectable energy to return to its original energy state, and Z is an O-glycosidically linked sugar molecule, which comprises reacting a monohydroxy enol ether having the formula:

with a tetra-O-acyl-D-hexopyranosyl halide to give a compound having the formula:



hydrolyzing the O-tetraacetate groups in the D-hexopyranoside tetraacetate to give a compound having the formula:
and oxygenating the double bond to give the corresponding 1,2-dioxetane compound.

4,956,478

METHOD FOR THE PRODUCTION OF ALKENYL-SUCCINIC ANHYDRIDES

Emanuel P. Fakoukakis, Brussels; Sorin V. Mustatea, Loncin, both of Belgium, and Günter Bellmann, Commugny, Switzerland, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 13, 1989, Ser. No. 406,938

Claims priority, application European Pat. Off., Sep. 14, 1988, 88810624.2

Int. Cl.[5] C07D *307/60*

U.S. Cl. 549—255 **8 Claims**

1. A method for manufacturing alkenyl-succinic anhydrides in a form sufficiently pure for using them directly, this method including the steps of:

(a) mixing one molar equivalent of maleic anhydride (MA) with α-monoolefins in a quantity corresponding to at least one olefinic bond molar equivalent and heating to a temperature below 200° C. but sufficient to ensure complete dissolution of the MA in the monoolefins and forming a homogeneous solution;

(b) heating this homogeneous solution in a closed vessel to a temperature between 200° and 260° C. where the reaction between the MA and the olefin proceeds smoothly to substantially near or full completion relative to the amount of MA used;

(c) distilling off unreacted α-olefins and MA, if any, and isolating the alkenyl-succinic anhydride products for further end-uses,

which comprises using as the starting α-monoolefins a 1:1 to 4:1 by weight mixture of dodecene and tetradecene, whereby no significant formation of polymeric by-products is observed, and isolating the desired alkenyl-succinic anhydride products by simply collecting the residue of distillation of step (c), no further purification being needed.

4,956,479

23-DEOXY-27-CHLORO DERIVATIVES OF LL-F28249 COMPOUNDS

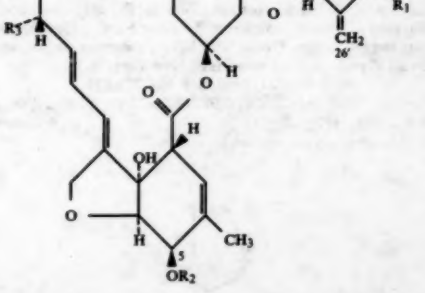
Susan Y. Tamura, Hamilton Sq., and Goro Asato, Titusville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 6, 1987, Ser. No. 22,848

Int. Cl.[5] A61K *31/335*; C07D *313/06*

U.S. Cl. 549—264 **19 Claims**

1. A compound represented by formula (I),



wherein R_1 is methyl, ethyl or isopropyl; R_2 is hydrogen or methyl; R_3 is hydrogen, methyl or ethyl; R_4 is methyl or ethyl; and X is chlorine.

4,956,480

7-AMINO-4-METHYL-COUMARIN-3-CARBOXYALKYL DERIVATES AND FLUORESCENT CONJUGATES THEREOF

Don Robinson, Brackenwood, Great Britain, assignor to BioCarb AB, Sweden

PCT No. PCT/SE86/00550, § 371 Date Jun. 17, 1988, § 102(e) Date Jun. 17, 1988, PCT Pub. No. WO87/03589, PCT Pub. Date Jun. 18, 1987

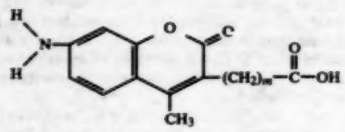
PCT Filed Dec. 2, 1986, Ser. No. 203,453

Claims priority, application Sweden, Dec. 3, 1985, 8505716

Int. Cl.[5] C07D *311/02*; C07H *15/00*

U.S. Cl. 549—288 **5 Claims**

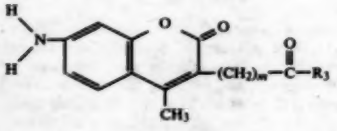
1. A compound having the formula (I):



(I)

or an ester or halide thereof, wherein m is an integer from 1 to 4 hydrogen.

4. A compound having the formula (II):



(II)

wherein m is an integer from 1 to 4 and R_3 is an N-oxysuccinimide substituent, a hydroxy substituent or a halogen substituent.

4,956,481

ADAMANTANE DERIVATIVES, COMPOSITIONS OF MATTER CONTAINING SAME, PROCESSES FOR PREPARING SAID ADAMANTANE DERIVATIVES AND SAID COMPOSITIONS, AND ORGANOLEPTIC AND DEODORANCY USES OF SAID ADAMANTANE DERIVATIVES AND SAID COMPOSITIONS

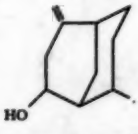
William Gillespey, Aberdeen; Myrna L. Hagedorn, Edison; Marie R. Haana, Hazlet; Kathleen E. Boardwick, Keyport; Charles E. J. Beck, Summit; Futoshi Fujioka, Oakhurst; Anthony G. Branco, Matawan; Anubhav Narula, Hazlet, and Richard M. Boden, Ocean, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Oct. 21, 1988, Ser. No. 261,275

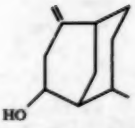
Int. Cl.[5] C07C *35/22*; C07D *307/00, 307/93*; C11D *3/50*

U.S. Cl. 549—459 **6 Claims**

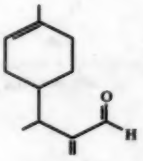
1. A compound having the structure:



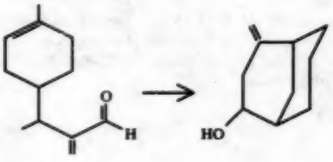
5. A process for producing a compound having the structure:



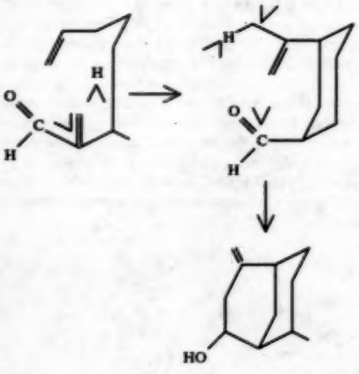
comprising the step of effecting the rearrangement of the compound having the structure:



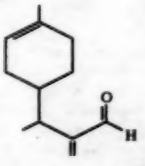
according to the over-all reaction:



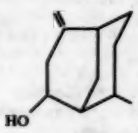
according to the mechanism:



comprising the step of heating the compound having the structure:



in the absence of acid at a temperature in the range of from about 130° C. up to about 250° C. for a period of time sufficient to form the product having the structure:



4,956,482

PROCESS FOR THE PREPARATION OF PREGNANE DERIVATIVES

Helmut Hofmeister, Berlin; Klaus Annen, Muenster-Albachten; Henry Laurent, and Rudolf Wiechert, both of Berlin, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

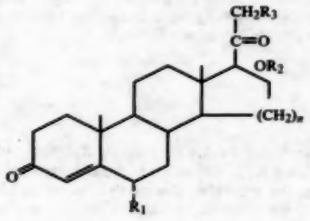
Continuation of Ser. No. 95,090, Sep. 11, 1987, which is a division of Ser. No. 776,923, Sep. 17, 1985, Pat. No. 4,708,823. This application Mar. 20, 1989, Ser. No. 325,585

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434448

Int. Cl.[5] C07J 1/00

U.S. Cl. 552—594 10 Claims

1. A process for preparing a pregnane derivative of the formula



wherein

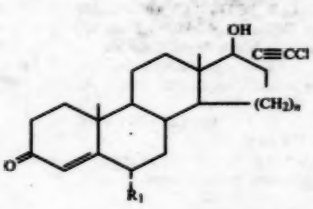
in each case is a single or double bond,

n is 1 or 2,

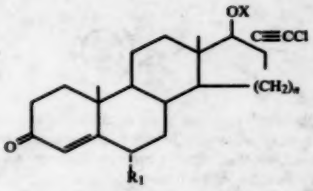
R_2 is hydrogen or formyl, and

R_3 is chlorine, hydroxy or alkanoyloxy of up to 6 carbon atoms,

comprising esterifying an androstane derivative of the formula



wherein , n and R_1 are as defined above, with nitric acid, trifluoroacetic acid, trichloroacetic acid, or a reactive derivative thereof, thereby forming the corresponding ester of the formula ,



wherein , n and R as defined above and

X is nitro, trifluoroacetyl, or trichloroacetyl,

reacting the latter ester in the presence of a catalytically effective amount of silver(I), with formic acid to form the pregnane of the formula t,0260

wherein , n and R_1 are as defined above, and, optionally, (a) saponifying the thus produced 17-formyl ester, (b) exchanging the 21-chlorine atom against an alkanoyloxy group, or (c) exchanging the 21-chlorine atom against the alkanoyloxy group and saponifying the latter.

4,956,483

MOLYBDENUM PHOSPHATE COMPOSITIONS

Edward W. Corcoran, Jr., Easton, Pa.; Robert C. Haushalter, Little York, and Wen-Yih F. Lai, Fairlawn, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 239,912, Sep. 2, 1988, abandoned. This application May 12, 1989, Ser. No. 350,970

Int. Cl.[5] C01G 39/02

U.S. Cl. 556—26 11 Claims

1. A composition of matter having the formula $[A_w(R_4X)_n(H_3O)_k]\{(Mo_7O_4)_p(O)_q[PO_{4-x}]_r\}\ mH_2O$ where A is Li, Na, K, Rb, Cs, Tl, Mg, Ca, Sr, Ba, NH_4 or combinations thereof R=, C_6H_5, or $C_\alpha H_{2\alpha+1}$; X is N, P, As, or combinations thereof; Mo has oxidation state $\leq +5$; $n>o$; $s\geq o$; $p, r>o$; $q, w, m\geq o$; and $o\leq x<4$.

4,956,484

PROCESS FOR PRODUCING A SILANE OR SILOXANE COMPOUND CONTAINING A CYCLOALKYL RING

Francesco Gementi, Milan; Loris Sogli, Novara, and Raffaele Ungarelli, Trecate, all of Italy, assignors to Instituto Guido Donegani S.p.A., Novara, Italy

Filed Mar. 3, 1988, Ser. No. 163,948

Claims priority, application Italy, Mar. 6, 1987, 41003 A/87

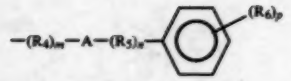
Int. Cl.[5] C07F 7/08, 7/10, 7/18

U.S. Cl. 556—410 14 Claims

1. A process for producing a silane or siloxane compound containing a cycloalkyl ring by catalytic hydrogenation, this process comprising hydrogenating, in the presence of a Raney nickel catalyst modified with chromium wherein the chromium content is from about 1 to 10% by weight of the nickel, a silane or siloxane compound containing at least an aromatic or heteroaromatic ring and having formula (I):

(I)

wherein X is an aryl, alkylaryl or arylalkyl group having from 6 to 20 carbon atoms or the radical



wherein R_4 and R_5 are the same or different and are each an alkylene radical containing from 1 to 20 carbon atoms; R_6 is an alkyl, alkoxy, alcohol, acid or ester radical containing from 1 to 20 carbon atoms; A is a heteroatom selected from the group consisting of oxygen, sulfur, nitrogen; m, n and p are zero or a whole number from 1 to 10; and R_1, R_2 and R_3 are the same or different and have the same definition as X or may be a hydrogen atom, an alkyl or alkylene radical containing from 1 to 20 carbon atoms, a linear or branched alkyl radical having from 1 to 20 carbon atoms and containing one or more alkoxy, carbonyl or carboxyl groups, or the group $N(R'')_2$ in which R'' is a hydrogen atom or an alkyl radical containing from 1 to 20 carbon atoms.

4,956,485

TRIALKYLSILYLOXY-1,1-DIPHENYL ETHYLENES AND POLYMERS PRODUCED THEREWITH

Edgar Leitz, Dormagen; Hans-Josef Buysch; Ludwig Bottenbruch, both of Krefeld, and Karl-Heinz Ott, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

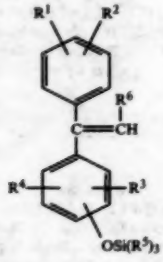
Filed Jun. 16, 1989, Ser. No. 367,002

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821745

Int. Cl.[5] C07C 7/18; C07F 7/18

U.S. Cl. 556—446 **3 Claims**

1. Trialkylsilyloxy-1,1-diphenyl ethylenes corresponding formula (I)



(I)

in which

R^1, R^2=H, C_1–C_4 alkyl, OCH_3,

R^3=H, C_1–C_4 alkyl, O-C_1–C_4 alkyl,

R^4=H, C_1–C_4 alkyl,

R^5=C_1–C_4 alkyl,

R^6=H, C_1–C_4 alkyl.

4,956,486

REMOVAL OF ORGANIC CHLORIDE FROM PHENYLCHLOROSILANES

Ollie W. Marko, and Robert D. Steinmeyer, both of Carrollton, Ky., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 7, 1990, Ser. No. 489,631

Int. Cl.[5] C07F 7/20

U.S. Cl. 556—466 **20 Claims**

1. A process for reducing organic chloride content of phenylchlorosilanes, where the phenylchlorosilanes are of formula

$\phi_a Me_b SiCl_{4-a-b}$

where a=1, 2, or 3; b=0, 1, or 2,; a+b=1, 2, or 3; ϕ is a phenyl radical; and Me is a methyl radical;

the process comprising:

(A) contacting a crude mixture containing as a major portion the phenylchlorosilanes and as minor portions an organic chloride and a phenyl source, with a catalyst; where the catalyst is a Lewis acid forming material;

(B) facilitating contact of the organic chloride with the catalyst and the phenyl source to convert the organic chloride to hydrocarbon adducts;

(C) separating the catalyst from the phenylchlorosilanes and the hydrocarbon adducts; and

(D) recovering the phenylchlorosilanes with lowered organic chloride content.

4,956,487

PROCESS FOR PRODUCTION OF THIOPHOSPHONATES

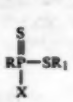
Jeffrey D. Robbins, Berkeley, and Richard D. Gless, Jr., Oakland, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Filed Dec. 12, 1988, Ser. No. 283,345

Int. Cl.[5] C07F 9/40

U.S. Cl. 558—98 **16 Claims**

1. A process for production of thiophosphonate compounds having the formula



in which R is alkyl, haloalkyl or aryl; X is chloro or SR_2; R_1 is alkyl or aryl; and when X is SH_2 then R_2 is a group identical to R_1, or R_1 and R_2 taken together form an optionally alkyl-substituted polymethylene group, comprising reacting a thiophosphonodichloride having the formula

with a mercaptan having the formula R_1SH, or HS—(R_1+R_2)—SH when R_1 and R_2 taken together form a polymethylene group, in the presence of a catalytic amount of a member selected from the group consisting of (a) quaternary ammonium or phosphonium salts having the general formula $R_3R_4R_5R_6Y^+Z^-$ in which Y is nitrogen or phosphorus, Z is an anion, and R_3, R_4, R_5, and R_6 are independently aromatic, aliphatic or aralkyl groups, the total number of carbon atoms in the quaternary onium cation being at least twelve; and (b) an alkali metal halide in combination with a Crown ether, in the substantial absence of a base.

4,956,488

OPTICALLY ACTIVE CYANOBIPHENYL COMPOUND

Toshihiro Shibata, and Masaki Kimura, both of Urawa, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

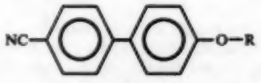
Filed Apr. 5, 1988, Ser. No. 177,979

Claims priority, application Japan, Apr. 13, 1987, 62-90150; Jun. 10, 1987, 62-144948

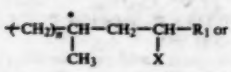
Int. Cl.[5] C07C 43/02

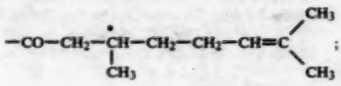
U.S. Cl. 558—414 **15 Claims**

1. An optically active cyanobiphenyl compound represented by the following general formula:



wherein, R is





X is hydrogen atom or chlorine atom; when X is hydrogen atom, R_1 is straight chain alkyl having from 1 to 11 carbon atoms and when X is chlorine atom, R_1 is hydrogen atom or straight chain alkyl having from 1 to 11 carbon atoms; n is 3 to 5; and * represents an asymmetric carbon atom.

4,956,489

WATER-SOLUBLE L-TYROSINE DERIVATIVES AND A PROCESS FOR PREPARING L-TYROSINE DERIVATIVES

Daniel H. Auriol; Francois B. Paul, both of Toulouse, and Pierre F. Monsan, Blagnac, all of France, assignors to Bioeurope, France

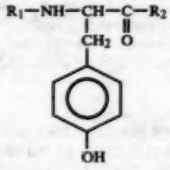
Filed Oct. 14, 1988, Ser. No. 257,823

Claims priority, application France, Oct. 19, 1987, 87 14352

Int. Cl.[5] C07C *101/32*

U.S. Cl. 560—40 **2 Claims**

1. L-tyrosine derivatives, characterized in that they have the general formula



(I)

where R_1 is an L-malyl group, and R_2 is an —OH, —OM, methoxy, ethoxy or amino group, M denoting an alkali metal.

4,956,490

PROCESS FOR PREPARING BENZYLPYRUVIC ACIDS AND ESTERS

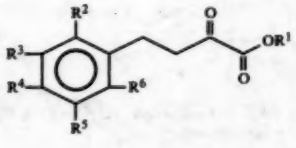
James W. McManus, Leesburg, and John F. Genus, Albany, both of Ga., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 9, 1989, Ser. No. 321,040

Int. Cl.[5] C07C *69/76*

U.S. Cl. 560—051 **29 Claims**

1. A continuous, non-isolation process for preparing benzylpyruvic acids and esters having the formula:



(I)

wherein

R^1 is H or C_1–C_4 alkyl; and

R^2–R^6 can be the same or different and are hydrogen, C_1–C_6 alkyl, aryl, halo (I, Cl, Br) nitro, hydroxy, alkoxy, phenoxy or nitrile,

which process comprises sequentially:

(a) condensing an aryl aldehyde with a pyruvate to obtain an unsaturated α-keto acid;

(b) esterifying said unsaturated α-keto acid with a C_1–C_4 alkyl chloroformate to obtain an unsaturated α-keto ester; and,

(c) reducing said unsaturated α-keto acid or unsaturated α-keto ester with hydrogen in the presence of a heterogeneous catalyst to obtain a compound of formula I,

said condensation, esterification and reduction being carried out sequentially and continuously without isolation of said unsaturated α-keto acid and said unsaturated α-keto ester intermediates.

4,956,491

ALPHA-ALKYLACRYLAMIDE DERIVATIVES AND THEIR POLYMERS

Yuji Suzuki, Osaka; Satoshi Urano, Kyoto; Hirotoshi Umemoto, Kyoto; Ryuzo Mizuguchi, Kyoto; Kei Aoki, Nara, and Noriyuki Tsuboniwa, Osaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Apr. 27, 1987, Ser. No. 42,713

Claims priority, application Japan, Apr. 25, 1986, 61-97760; Apr. 25, 1986, 61-97761

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.[5] C07C *103/147*

U.S. Cl. 560—172 **3 Claims**

1. An N-(substituted oxalyl)-alpha-alkylacrylamide of the formula: CH_2=CR—CO—NH—CO—CO—OR', wherein R is a lower alkyl group and R' has a molecular weight of not more than 500 and is selected from the group consisting of an alkenyl group, an alkynyl group, an aryl group, an aralkyl group and an alkyl group substituted with alkenyloxy.

4,956,492

DIALKYL FUMARATE - VINYL ACETATE COPOLYMERS USEFUL AS DEWAXING AIDS

Abraham R. Dekraker, Sarnia, Canada, and David J. Martella, Plainsboro, N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Division of Ser. No. 589,536, Mar. 14, 1984, Pat. No. 4,670,130. This application Dec. 19, 1986, Ser. No. 944,545

Int. Cl.[5] C07C *69/60*

U.S. Cl. 560—190 **4 Claims**

1. A copolymer of dialkyl fumarate and vinyl acetate suitable for use as a dewaxing aid in wax containing oil wherein the improvement comprises said copolymer having a Specific Viscosity measured at 2 wt. % solution in xylene at 40° C. of at least 2.5, and wherein 50 to 100 wt. % of said alkyl groups are C_{20} to C_{24} alkyl groups.

4,956,493

PROCESS FOR PRODUCING METHACRYLIC ESTER

Masutoshi Ueoka; Syoichi Matsumoto, both of Himeji; Hiroshi Yoshida, Toyanaka, and Masao Baba, Himeji, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Apr. 14, 1988, Ser. No. 181,369

Claims priority, application Japan, Apr. 16, 1987, 62-91932; Aug. 6, 1987, 62-195347

Int. Cl.[5] C07C *67/00*

U.S. Cl. 560—208 **8 Claims**

1. A process for producing a methacrylic ester which comprises catalytically oxidizing isobutylene, tert-butanol, methacrolein or isobutyl aldehyde in a vapor phase; removing light-boiling substances from the resulting reaction product by distillation or stripping; extracting methacrylic acid from the resulting methacrylic acid aqueous solution using a saturated chain aliphatic hydrocarbon having 6 to 9 carbon atoms as a solvent; recovering the solvent from the obtained solvent solution of methacrylic acid; esterifying the resulting methacrylic acid by the reaction of it with a lower aliphatic alcohol or a lower

alicyclic alcohol having 1 to 12 carbon atoms using a porous strongly acidic cation exchange resin as a catalyst for esterification; and then subjecting the thus obtained esterification reaction product to a purification step.

4,956,494

OXIDATION OF THIOLS, DISULFIDES AND THIOLSULFONATES

Altaf Hussain, East Norriton, Pa., and Gregory A. Wheaton, Logan Township, Gloucester County, N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation of Ser. No. 112,648, Oct. 26, 1987, abandoned. This application Jun. 15, 1989, Ser. No. 366,350

Int. Cl.[5] C07C *139/00, 51/58*

U.S. Cl. 562—118 **13 Claims**

1. A process for preparing alkanesulfonic acids and alkanesulfonyl chlorides comprising contacting an alkanethiol, a dialkyldisulfide or an alkyl alkanethiolsulfonate mixed in aqueous hydrochloric acid with hydrogen peroxide to produce the corresponding alkanesulfonic acid or alkanesulfonyl chloride, the concentration of hydrogen chloride being from 10 to 38 percent based on the weight of said aqueous hydrochloric acid and the amount of hydrogen chloride used ranges from 1 to 10 moles for each mole of alkanethiol and from 2 to 20 moles for each mole of dialkyldisulfide or alkyl alkanethiolsulfonate.

4,956,495

PROCESS FOR PREPARING UNSATURATED NITROGEN CONTAINING ACIDS

Woodrow W. White, Akron, Ohio, assignor to GenCorp. Inc., Fairlawn, Ohio

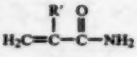
Division of Ser. No. 214,968, Jul. 5, 1988, which is a continuation of Ser. No. 930,485, Nov. 14, 1986, abandoned. This application Dec. 18, 1989, Ser. No. 451,660

Int. Cl.[5] C07C *101/30*

U.S. Cl. 562—567 **5 Claims**

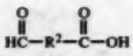
1. A process for preparing an unsaturated nitrogen containing acid, comprising the steps of:

adding an unsaturated amide reactant to a vessel, said unsaturated amide having the formula



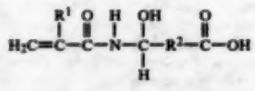
where R^1 is H, or an alkyl having from 1 to 3 carbon atoms,

adding an aldehyde acid reactant to said vessel, said aldehyde acid having the formula



where R^2 is nonexistent, CH_2, or C_2H_4, where the equivalent amount of said amide to said acid is from about 1.2 to about 2.4 equivalents, and

reacting said reactants in the presence of an acidic aqueous reaction medium having a pH of from about 1.2 to less than 7.0 and producing a salt free unsaturated nitrogen containing acid, said unsaturated nitrogen containing acid having the formula



wherein R^1 is H, or an alkyl having from 1 to 3 carbon atoms, wherein R^2 is nonexistent, CH_2, or C_2H_4.

4,956,496

PROCESS FOR ALLYLATION OF PERHALOALKYL-, PERHALOALKOXY- AND PERHALOALKYLTHIOANILINES IN THE PRESENCE OF A CATALYST

Jean-Pierre Denis, Doyet; Jean-Roger Desmurs, Communay, and Jean-Pierre LeCouve, Caluire, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie Cedex, France

Filed Dec. 23, 1988, Ser. No. 288,880

Claims priority, application France, Dec. 23, 1987, 87 18011

Int. Cl.[5] C07C *209/10*

U.S. Cl. 564—404 **16 Claims**

1. A process for the preparation of an N-allylperhaloalkyl-, -perhaloalkoxy- or perhaloalkylthioaniline, which comprises placing a perhaloalkylated, perhaloalkoxylated or perhalothioalkylated aniline and an allyl halide in a solvent medium in contact with an effective amount of a metal catalyst selected from palladium, copper and nickel.

4,956,497

PHENYLENE ETHER RESIN BASED THERMOPLASTIC COMPOSITIONS

Peter H. Thompson, and Richard J. Smalling, both of Parkersburg, W. Va., assignors to General Electric Company, Selkirk, N.Y.

Continuation-in-part of Ser. No. 928,129, Nov. 7, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,013

Int. Cl.[5] C08K *5/01*; C08L *51/00, 53/00, 72/00*

U.S. Cl. 524—474 **10 Claims**

1. A thermoplastic polymer composition comprising:

(a) a phenylene ether resin;

(b) a preformed, two-phase high impact vinyl aromatic resin which includes a vinyl aromatic monomer and a rubber, at least some of said vinyl aromatic monomer being graft polymerized with said rubber; and

(c) a preformed styrenic homopolymer having a number average molecular weight of about 65,000 to 120,000.

4,956,498

COUPLING AGENTS FOR VULCANIZABLE MIXTURES OF UNSATURATED RUBBERS AND SILICON-CONTAINING FILLERS

Dieter Zerpner, and Horst G. Haag, both of Marl, Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 373,272

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821670

Int. Cl.[5] C08K *3/34*; C08C *19/00*; C08F *20/44*

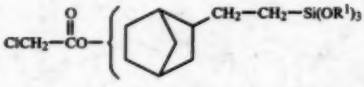
U.S. Cl. 524—492 **6 Claims**

1. A vulcanizable mixture, comprising:

(a) an unsaturated rubber;

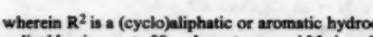
(b) an inorganic filler;

(c) a coupling agent which is the reaction product of a 2(3)-chloroacetoxy-5-(2'-trialkoxysilylethyl)norbornane of the formula:



(I)

wherein R^1 is methyl and/or ethyl, with a thiosulfonic acid salt of the formula:



(II)

wherein R^2 is a (cyclo)aliphatic or aromatic hydrocarbon radical having up to 20 carbon atoms, and Me is sodium or potassium; and

(d) rubber processing additives.

4,956,499

POLYARYLENE THIOETHER COMPOSITION FOR MOLDING

Makoto Fukuda; Sirou Suzuki; Toshio Hosokawa; Yo Iizuka; Yukichika Kawakami, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and Polyplastics Co., Ltd., Osaka, both of Japan

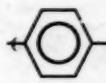
Filed Mar. 30, 1988, Ser. No. 175,250

Claims priority, application Japan, Mar. 30, 1987, 62-77021

Int. Cl.[5] C08L *81/02*

U.S. Cl. 524—500 7 Claims

1. A composition of polyarylene thioether for molding, having an improved anti-flash property, comprising (i) 100 parts by weight of the sum of components A and B, which is prepared by combining 0.2 to 90 parts by weight of component B with 100 parts by weight of component A, and (ii) 0 to 400 parts by weight of component C, component A being a resin comprising a polyarylene thioether which has a repeating unit of



as the main constituent, having a melt viscosity, measured at 310° C. under a shear rate of 5/second, of 10 to 5×10^4 poise; component B being a cross-linked polyarylene thioether having a melt viscosity, measured at 310° C. under a shear rate of 5/second, of 5×10^5 to 1×10^9 poise and becomes a gel when it is heated; component C being a fibrous filler, a non-fibrous inorganic filler or a mixture thereof.

4,956,500

VULCANIZABLE RUBBER COMPOUND WITH IMPROVED TACKIFIER

Doan R. Vermilion, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sep. 6, 1988, Ser. No. 241,428

Int. Cl.[5] C08L *7/00, 9/00, 9/06, 95/00*

U.S. Cl. 525—54.5 16 Claims

1. In a vulcanizable composition comprising a vulcanizable rubber and at least one rubber additive which is a tackifier and optionally including fillers, the tackifier being present in a minor but effective tack enhancing amount, the improvement wherein said tackifier is a preformed reaction product of a mixture consisting essentially of asphalt and a vulcanizable rubber, wherein said vulcanizable composition except for said reaction product is substantially free of asphalt.

4,956,501

POLYESTERS HAVING IMPROVED IMPACT STRENGTH

Ronald H. Sunseri, and Michael W. O'Rourke, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Division of Ser. No. 214,861, Jul. 1, 1988, which is a division of Ser. No. 105,455, Oct. 1, 1987, abandoned, which is a continuation of Ser. No. 800,333, Nov. 21, 1985, abandoned. This application Oct. 19, 1988, Ser. No. 259,805

Int. Cl.[5] C08L *67/02*

U.S. Cl. 525—64 16 Claims

1. A method for producing a thermoplastic composition of a polyester resin matrix having improved unnotched izod impact strength at the knitline and improved notched izod impact strength comprising blending 60 to 90 parts by weight of the matrix resin with 40 to 10 parts by weight of a backbone rubber formed by interpolymerization of ethylene, a mono-olefin having from 3 to 16 carbon atoms and a polyene on which there is grafted an ester of methacrylic acid or acrylic acid having an epoxide functionality on the alkoxy portion of the ester, said ester being present in a range of about 1.5 to 20 percent by weight based on the weight of the rubber to disperse the rubber in the matrix, and then reacting the dispersion with a cross-linking agent selected from the group consisting of a diamine and a diacid or its anhydride to provide a cross-linking limited primarily to the rubber phase.

4,956,502

PROCESS FOR THE PREPARATION OF ROOPEROL DERIVATIVE

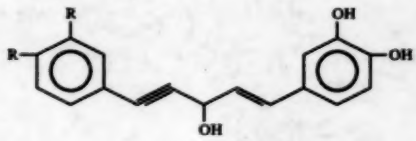
George L. Wenteler, Pretoria; Karl H. Regel, Durban; Siegfried Drews, Pietermaritzburg, and Hans Kundig, Witpoort, all of South Africa, assignors to Rooperol (N.A.) NV, Bonaire, Netherlands Antilles

Continuation-in-part of Ser. No. 875,398, Jun. 17, 1986, abandoned. This application Jun. 13, 1989, Ser. No. 365,494

Int. Cl.[5] C07C *39/205, 39/21, 33/28*

U.S. Cl. 568—729 1 Claim

1. A process for preparing a compound of the formula



in which both Rs are H or OH comprising the steps

a. of treating the ethyl ester of caffeic acid with trialkylsilyl chloride at ambient conditions in equimolar proportions in the presence of imidazole;

b. the reduction of the ester to the corresponding allylic alcohol with aluminium hydride reagent;

c. of oxidizing the resulting product with manganese dioxide at ambient temperature and in excess molar proportion to yield the corresponding allylic aldehyde;

d. of coupling the latter with the silyl ether of the relative phenyl acetylide; and

e. of hydrolysis of this coupled product with alkylammonium fluoride at ambient conditions in equimolar proportions.

4,956,503

PROCESS FOR THE PREPARATION OF N-CYANOETHANIMIDIC ACID ESTERS

Stefan Weiss; Helmut Krommer, and Karl-Heinz Neuhauser, all of Trostberg, Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany

Filed Apr. 18, 1989, Ser. No. 339,806

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815084

Int. Cl.[5] C07C *261/04*

U.S. Cl. 564—106 13 Claims

1. A process for the preparation of N-cyanoethanimidic acid esters consisting essentially of reacting orthoacetic acid esters with cyanamide in the presence of an acid catalyst and in an alcoholic reaction medium at a temperature up to about 90° C., said acid catalyst comprising one or more compounds which contain, or liberate in the reaction mixture, 10^{-6} to 10^{-1} mole of protons per mole of orthoacetic acid ester.

4,956,504

SPERGUALIN-RELATED COMPOUNDS AND PROCESS FOR PRODUCING THE SAME

Tomio Takeuchi, Tokyo; Tetsushi Saino, Yono, both of Japan; Masao Yoshida, Hastings-on-Hudson, N.Y.; Katsutoshi Takahashi, Tokyo; Teruya Nakamura, Kusatsu, both of Japan, and Hamao Umezawa, deceased, late of Tokyo (by Mieko Umezawa, Kazuo Umezawa, Yoji Umezawa, administrators), assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

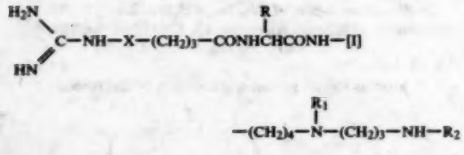
Filed Apr. 1, 1987, Ser. No. 32,811

Claims priority, application Japan, Apr. 4, 1986, 61-77747

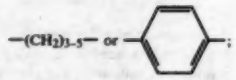
Int. Cl.[5] C07C *129/12*

U.S. Cl. 564—153 **10 Claims**

1. A spergualin-related compound represented by the formula [I]

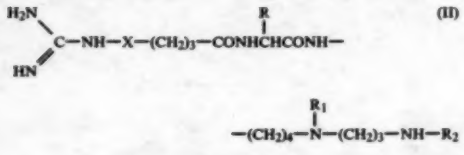


wherein X is

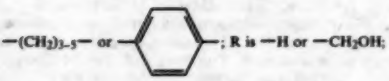


R is —H or —CH_2OH; R_1 is —H, R_2 is a residue obtained by removing, from an amino acid or peptide, the hydroxyl group of the alpha-carboxyl group, or a pharmaceutically acceptable salt thereof.

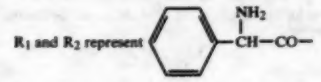
5. A novel spergualin-related compound represented by the formula [II]



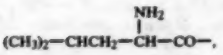
wherein X is



R_1 and R_2 represent



or



or a pharmaceutically acceptable salt thereof.

4,956,505

PROCESS FOR THE PREPARATION OF 4,4-DIMETHYL-1-(P-CHLOROPHENYL)PENTAN-3-ONE

Franz-Josef Mais, Duesseldorf; Helmut Fiege, and Karl-Wilhelm Henneke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 5, 1989, Ser. No. 375,761

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824518

Int. Cl.[5] C07C *45/62*

U.S. Cl. 568—316 **17 Claims**

1. In a process for the preparation of 4.4-dimethyl-1-(p-chlorophenyl)pentan-3-one by condensation of pinacolone and p-chlorobenzaldehyde in an alcohol as solvent in the presence of an inorganic base and subsequent hydrogenation the improvement comprising

(a) hydrogenating the reaction mixture obtained in the condensation directly without isolation of the intermediate 4,4-dimethyl-1-(p-chlorophenyl)-1-pentan-3-one said hydrogenation being conducted in the presence of a Raney Nickel to which compounds of divalent sulphur are added hydrogenation catalyst at a temperature of about 50–130° C. and superatmospheric pressure to give 4,4-dimethyl-1-1-1-(p-chlorophenyl) pentan-3-one,

(b) separating the hydrogenation catalyst off from the liquid hydrogenation mixture, largely distillijng off the alcohol, and adjusting the water content of the bottom product of the distillation in such a manner that te distillation mixture separates into an aqueous and an organic phase and

(c) recovering 4,4-dimethyl-1-(p-chlorophenyl)pentan-3-one from the organic phase.

4,956,506

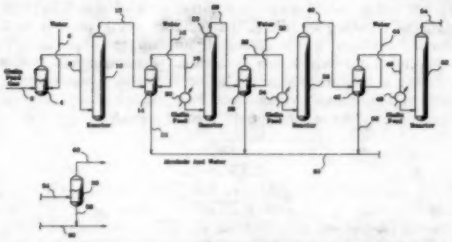
VAPOR-PHASE HYDRATION OF OLEFINS TO ALCOHOLS IN SERIES REACTORS WITH INTERMEDIATE ALCOHOL REMOVAL

Edward G. Latimer, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Dec. 21, 1989, Ser. No. 454,796

Int. Cl.[5] C07C *29/04, 31/08, 31/10*

U.S. Cl. 568—899 **19 Claims**



1. A process for converting olefins to alcohols which comprises the steps of:

(a) contacting a feed gas containing an olefin selected from the group consisting of ethylene, propylene, butylene, or pentylene and mixtures thereof with a perfluorinated ion-exchange polymer catalyst under vapor phase reaction conditions in a first reaction zone, wherein from about 1 to about 20 weight percent of said olefins are converted to alcohols;

(b) contacting effluent gases from the first reaction zone with water whereby alcohols are extracted from said gases in water solution;

(c) contacting the extracted effluent gases from the first reaction zone with additional perfluorinated ion-exchange catalyst under vapor phase reaction conditions in a second reaction zone connected in series with the first reaction zone whereby from about 1 to about 20 weight percent of

said olefins in the extracted effluent gases are converted to alcohols;

(d) contacting effluent gases from the second reaction zone with water whereby alcohols are extracted from said gases in water solution;

(e) contacting the extracted effluent gases from the second reation zone with additional perfluorinated ion-exchange catalyst under vapor phase reaction conditions in a third reaction zone connected in series with the first and second reaction zones whereby from about 1 to about 20 weight percent of said olefins in the extracted effluent gases are converted to alcohols;

(f) contacting effluent gases from the third reaction zone with water whereby alcohols are extracted from said gases in water solution; and

(g) recovering the alcohol products from each reaction zone.

4,956,507

PROCESS FOR PREPARING 4,4'-DIFLUOROBIPHENYL

Michael S. Matson, Bartlesville, Okla., and Raymond L. Cobb, Maretta, Ohio, assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 3, 1989, Ser. No. 431,244
Int. Cl.[5] C07C *17/26, 25/18*
U.S. Cl. 570—140 **15 Claims**

1. An improved process for preparing 4,4'-difluorobiphenyl comprising the steps of:

reacting p-halofluorobenzene with magnesium in a solvent to form a halomagnesiumfluorobenzene Grignard reagent; and then

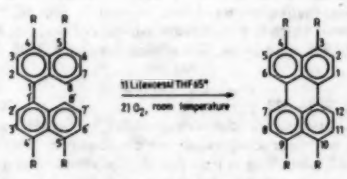
reacting said Grignard reagent with additional p-halofluorobenzene in said solution in the presence of a palladium chloride triphenyl-phosphine catalyst for a time period sufficient to form a high yield of said 4,4'-di-fluorobiphenyl.

4,956,508

PROCESS FOR PREPARING POLYALKYL PERYLENES, PERYLENES OBTAINED BY THIS PROCESS, AND ORGANIC MATERIALS WITH ESR PROPERTIES DERIVED FROM THE SAME

Philippe Michel; Alexandre Moradpour, both of Paris, and Paul Penven, Orsay, all of France, assignors to Thomson-CSF, Paris, France

Filed Feb. 8, 1989, Ser. No. 307,550
Claims priority, application France, Feb. 12, 1988, 88 01682
Int. Cl.[5] C07C *13/465*
U.S. Cl. 585—26 **1 Claim**



1. A polyalkyl perylene compound which has the formula:

wherein R is methyl.

4,956,509

INTEGRATED PARAFFIN UPGRADING AND CATALYTIC CRACKING PROCESSES

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Oct. 16, 1989, Ser. No. 422,368
Int. Cl.[5] C10G *35/06*
U.S. Cl. 585—300 **28 Claims**

1. A process for endothermically upgrading a paraffinic feedstream comprising the steps of:

(a) mixing a hydrocarbon feed with a regenerated cracking catalyst in a fluidized bed catalytic cracking reaction zone under cracking conditions sufficient to convert at least a portion of said hydrocarbon feed to product containing gasoline and distillate boiling range hydrocarbons whereby said regenerated cracking catalyst is at least partially coked and deactivated;

(b) withdrawing a portion of said at least partially coked and deactivated cracking catalyst from said catalytic cracking reaction zone;

(c) contacting said at least partially coked and deactivated cracking catalyst with an oxygen-containing regeneration gas in a fluid bed oxidative regeneration zone maintained at superatmospheric pressure, whereby coke is oxidatively removed from said cracking catalyst and a hot flue gas is generated;

(d) contacting a C_2–C_{10} paraffinic feedstream with a second catalyst in a catalytic paraffin upgrading reaction zone under conversion conditions to produce a reaction zone effluent stream; and

(e) maintaining pressure within said fluid bed oxidative regeneration zone by withdrawing hot flue gas from said oxidative regeneration zone and flowing said withdrawn hot flue gas through a heat exchange conduit positioned within said catalytic paraffin upgrading reaction zone to heat said catalytic paraffin upgrading reaction zone and to cool said flue gas.

4,956,510

HYDROCARBON UPGRADING PROCESS AND REACTION SECTION DESIGN WITH REGENERATED CATALYST QUENCH

Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corp., New York, N.Y.

Filed Mar. 14, 1989, Ser. No. 322,956
Int. Cl.[5] C07C *12/02, 5/333;* C10G *35/095*
U.S. Cl. 585—415 **25 Claims**

1. A process for converting an aliphatic feedstream comprising the steps of:

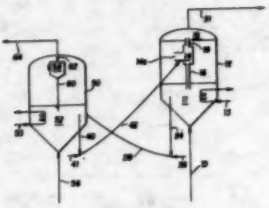
(a) maintaining a catalyst in a reaction zone;

(b) contacting said aliphatic feedstream with said catalyst under conversion conditions evolving a product stream and at least partially deactivating said catalyst;

(c) separating said product stream from said catalyst;

(d) withdrawing a portion of said at least partially deactivated catalyst from said catalyst bed;

(e) regenerating said withdrawn portion of at least partially deactivated catalyst of step (b), above, at a temperature below that maintained in said reaction zone of step (a), above; and



(f) quenching said product stream by directly contacting said product stream with regenerated catalyst to lower the temperature of said product stream sufficiently to avoid substantial thermal cracking of said product stream to light C_2-hydrocarbons.

4,956,511

TOLUENE DISPROPORTIONATION PROCESS

James R. Butler, Houston, and J. Randall Curtis, Webster, both of Tex., assignors to Fina Technology, Inc., Dallas, Tex.

Filed Jan. 4, 1989, Ser. No. 293,374

Int. Cl.[5] C10C 3/62

U.S. Cl. 585—475 **30 Claims**

1. In a method for the disproportionation of a toluene feedstock to produce a disproportionation product containing benzene and xylene, the steps comprising:

(a) initiating a startup procedure comprising:

(1) establishing a catalyst reaction zone by loading into said reaction zone a mordenite disproportionation catalyst modified by the inclusion of nickel into said catalyst;

(2) establishing a hydrogen environment in said reaction zone while said reaction zone is at ambient temperature;

(3) progressively heating said reaction zone while maintaining said reaction zone under a hydrogen environment until an intermediate temperature within the range of 250–500° F. is reached;

(4) thereafter supplying said toluene feedstock and hydrogen to said reaction zone;

(5) further continuing the heating of said reaction zone from said intermediate temperature to a higher initial toluene disproportionation temperature of at least 600° F.;

(b) thereafter continuing to supply hydrogen and said hydrogen and toluene containing feedstock to said reaction zone to carry out the disproportionation of toluene to a disproportionation product containing benzene and xylene in the presence of said catalyst;

(c) withdrawing said disproportionation product from said reaction zone.

4,956,512

PROCEDURE FOR PRODUCING POLY-ALPHA-OLEFINE-TYPE LUBRICANTS

Fredrik Nisulk, Porvoo; Salme Koskimies, Helsinki; Peter Idelman, Vantaa; Matti Nurminen, and Salla Roni, both of Porvoo, all of Finland, assignors to Neste Oy, Finland

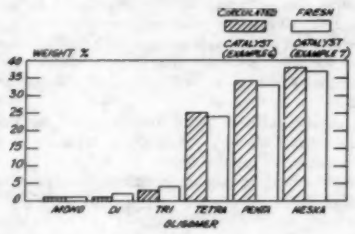
Filed Nov. 14, 1988, Ser. No. 271,022

Claims priority, application Finland, Nov. 12, 1987, 874999

Int. Cl.[5] C07C 2/02

U.S. Cl. 585—521 **10 Claims**

1. Method for the production of poly-alpha-olefine containing lubricants, which comprises subjecting at least one olefine in the presence of a BF_3 cocatalyst complex to oligomerization, thus forming a reaction product comprising a poly-alpha-olefine oligomer and said BF_3 cocatalyst complex, wherein said cocatalyst is either a C_1–C_{15} alcohol or a C_1–C_7 carboxylic acid,



subjecting the thus formed reaction product to distillation, thereby separating said BF_3 cocatalyst complex from said oligomer, and

conducting the thus separated BF_3 cocatalyst complex to a new oligomerization reaction, whereby said complex acts as catalyst for such oligomerization reaction.

4,956,513

RECOVERY OF BF_3 FROM OLEFIN OLIGOMER PROCESS

Howard W. Walker, and Ronny W. Lin, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 17, 1988, Ser. No. 258,387

Int. Cl.[5] C07C 2/08

U.S. Cl. 585—525 **22 Claims**

1. A process for recovering BF_3 from an α-olefin oligomerization procedure, said procedure being conducted by oligomerizing an α-olefin in the presence of BF_3 and at least one promoter for BF_3 which promoter is water, a water insoluble promoter, or a water soluble promoter wherein said water soluble promoter has a boiling point below the boiling point of $BF_3.2H_2O$, or which forms an azeotrope with water having a boiling point below the boiling point of $BF_3.2H_2O$, said process comprising:

(A) water washing the oligomerization mixture after completing the oligomerization procedure to extract BF_3 as a BF_3 hydrate together with any water soluble promoter used in the procedure and

(B) distilling water and water soluble promoter, if any, from the resultant wash water at a temperature below that at which substantial hydrolysis of the BF_3 occurs, leaving as a residue a concentrated aqueous BF_3 hydrate solution.

4,956,514

PROCESS FOR CONVERTING OLEFINS TO HIGHER HYDROCARBONS

Cynthia T-W. Chu, Princeton Junction, N.J., assignor to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Jan. 8, 1990, Ser. No. 461,896

Int. Cl.[5] C07C 2/12

U.S. Cl. 585—533 **20 Claims**

1. A process for converting olefin to higher molecular weight hydrocarbon product which comprises contacting a feedstock containing at least one oligomerizable olefin with an olefin oligomerization catalyst composition under olefin oligomerization conditions to provide said higher molecular weight hydrocarbon product, said olefin oligomerization catalyst

comprising a synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table I of the specification.

4,956,515

DEHYDROGENATION PROCESS AND CATALYST

John H. Kolts, Ochelata, and Gary A. Delzer, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 5, 1988, Ser. No. 279,608
Int. Cl.[5] C07C 4/02
U.S. Cl. 585—651 17 Claims

1. A process for converting hydrocarbons to less saturated hydrocarbons which comprises the step of

contacting a feed comprising at least one hydrocarbon selected from the group consisting of propane, n-butane and isobutane with a solid catalyst composition consisting essentially of zinc oxide and manganese oxide,

at a temperature of about 620° to about 700° C., under such contacting conditions as to convert at least a portion of said at least one hydrocarbon contained in said feed to at least one less saturated hydrocarbon containing fewer carbon atoms per molecule than said at least one hydrocarbon contained in said feed.

4,956,516

DISPROPORTIONATION OF OLEFINS

David M. Hamilton, Jr., and Richard A. Kemp, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 20, 1988, Ser. No. 196,576
The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.
Int. Cl.[5] C07C 6/00
U.S. Cl. 585—646 52 Claims

1. A process for the disproportionation of olefinic hydrocarbons having carbon numbers ranging from C_2 to about C_{100} which comprises contacting said olefinic hydrocarbons at disproportionation conditions with a catalyst prepared by a process which comprises:

(a) preparing an alumina hydrogel having a sufficient water content to provide a hydrogel which is thixotropic,

(b) mixing said alumina hydrogel with cobalt, a heavy metal selected from the group consisting of molybdenum, tungsten and mixtures thereof, and a phosphorus-containing compound in an amount of from about 0.17 to about 7.1 moles of phosphorus per mole of heavy metal at a pH in the range between about 4.0 and about 10.0 and a temperature in the range between about 25° C. and about 100° C. until adsorption of the cobalt, heavy metal and phosphorus-containing compound onto the gel is sufficient to yield a final catalyst having from about 0.1% by weight to about 5% by weight cobalt from about 5% by weight to about 32% by weight heavy metal, and from about 1% by weight to about 6% by weight phosphorus,

(c) extruding the product of step (b), and

(d) calcining the product of step (c) at a temperature of at least about 700° C.

4,956,517

DEHYDROGENATION PROCESS UTILIZING A PILLARED LAYERED SILICATE PLUS A BASE METAL OR NOBLE METAL

Ivy D. Johnson, Medford; Pochen Chu, Voorhees, both of N.J., and Charles T. Kresge, West Chester, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 29, 1989, Ser. No. 459,215
Int. Cl.[5] C07C 5/333
U.S. Cl. 585—660 6 Claims

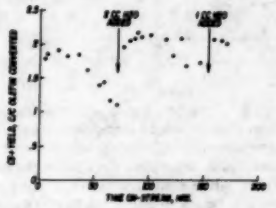
1. A process for producing unsaturated hydrocarbons which comprises contacting a feed containing saturated C_2 to C_5 hydrocarbons with a catalyst at a pressure of about atmospheric to 1000 psig, a weight hourly space velocity of about 0.05 to 300 and a temperature of about 204° to 675° C., wherein said catalyst comprises a layered silicate and pillars of an oxide of at least one element selected from Groups IB, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIA, VIIA and VIIIA of the Periodic Table of Elements separating the layers of the silicate, said catalyst comprising at least one element selected from the group consisting of Cr, Mo, W, Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, and Pt.

4,956,518

HETEROGENEOUS ISOPARAFFIN/OLEFIN ALKYLATION

Jonathan E. Child, Sewell; Tai-Sheng Chou, Pennington, both of N.J.; Albin Huss, Jr., Chadds Ford; Clinton R. Kennedy, West Chester, both of Pa.; Francis P. Ragonese, Cherry Hill, and Samuel A. Tabak, Wenonah, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 219,129, Jul. 15, 1988, abandoned. This application Jul. 11, 1989, Ser. No. 377,993
Int. Cl.[5] C07C 2/58
U.S. Cl. 585—726 19 Claims



1. A continuous alkylation process for producing high octane gasoline comprising effecting reaction of an isoparaffin containing from 4 to 20 carbon atoms with an olefin containing from 2 to 12 carbon atoms at from about −40° to about 500° C. and at a pressure in the range of subatmospheric to about 5000 psig using a hydrocarbon feed wherein a molar ratio of the isoparaffin to the olefin in the hydrocarbon feed is from about 0.5:1 to about 200:1 in contact with a composite catalyst comprising a Lewis acid with a non-zeolitic solid inorganic oxide in the presence of water wherein a molar ratio of the water to said Lewis acid is less than about 1:1.

4,956,519

CATALYST FOR HYDROCARBON CONVERSION AND CONVERSION PROCESS UTILIZING THE SAME

Elmer J. Hollstein, Wilmington, Del.; James T. Wei, Ridgewood, N.J., and Chao-Yang Hsu, Media, Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.

Division of Ser. No. 247,225, Sep. 21, 1988, Pat. No. 4,918,041. This application Nov. 13, 1989, Ser. No. 434,743
Int. Cl.[5] C07C 5/13
U.S. Cl. 585—751 3 Claims

1. Method of isomerizing a feedstock comprising acyclic hydrocarbons having 4 to 7 carbon atoms per molecule which comprises contacting said feedstock at a temperature in the range from 0 to 400° C., and a pressure in the range from 1 to 50 atmospheres with a solid mixture of (1) oxide or hydroxide of element from a first class consisting of Group III or Group IV elements, (2) oxide or hydroxide of metal from a second class consisting of Group V, Group VI or Group VII metals, and (3) oxide or hydroxide of Group VIII metals, the ratio of metal from said second class to Group VIII metal being in the range from 0.1:1 to 2.0:1.

4,956,520

SEPARATION PROCESS

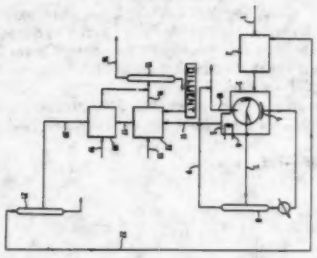
David S. Flett, Middlesbrough, and John E. Lloyd, Darlington, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 9, 1987, Ser. No. 106,368

Claims priority, application United Kingdom, Oct. 9, 1986, 8624266

Int. Cl.[5] C07C *7/14*

U.S. Cl. 585—815 **11 Claims**



1. A process for the separation of a crystallisable component from a solution thereof which comprises crystallising at least part of the component by chilling the solution to give a mixture of crystals and liquid, separating crystals of the component in a first separator while simultaneously washing said crystals with a first wash liquid, melting said crystals to produce a second solution of the component, chilling said solution to produce a second mixture of crystals of the component and liquid, separating crystals of the component in a second separator and washing the crystals thus obtained with a second wash liquid.

4,956,521

ADSORPTION AND ISOMERIZATION OF NORMAL AND MONO-METHYL PARAFFINS

Warren K. Volles, Mount Kisco, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Oct. 6, 1988, Ser. No. 254,156

Int. Cl.[5] C07C *7/13, 7/135*

U.S. Cl. 585—826 **26 Claims**

1. A process for separating isopentane and di-methyl branched hexane paraffins from a hydrocarbon feed containing isopentane, mono-methyl branched hexane paraffins, and di-methyl branched hexane paraffins, which comprises the steps of:

(a) passing said hydrocarbon feed through an adsorber bed containing a microporous molecular sieve adsorbent having pores of an elliptical cross-section with pore dimensions between about 5.0 and 5.5 along the minor axis and between about 5.5 and 6.0 along the major axis, wherein mono-methyl branched hexane paraffins and isopentane are adsorbed and isopentane is preferentially desorbed during continued adsorption to provide a mass transfer zone having isopentane concentrated at the leading edge thereof;

(b) removing an essentially non-adsorbed fraction comprising di-methyl branched hexane paraffins from said adsorber bed as a portion of an adsorption effluent;

(c) eluting at least a portion of the mass transfer zone which comprises isopentane from said adsorber bed as another portion of the adsorption effluent; and

(d) desorbing mono-methyl branched hexane paraffins from said adsorber bed to regenerate the adsorber bed and produce a desorption effluent comprising mono-methyl branched hexane paraffins.

4,956,522

ZEOLITIC PARA-ETHYLTOLUENE SEPARATION WITH TETRALIN HEAVY DESORBENT

Hermann A. Zinnen, Evanston, Ill., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 197,787, May 23, 1988, Pat. No. 4,886,930. This application Nov. 20, 1989, Ser. No. 439,058

Int. Cl.[5] C07C *7/12*

U.S. Cl. 585—828 **6 Claims**

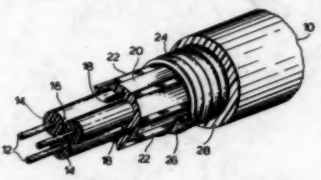
1. A process for separating p-ethyltoluene from a mixture comprising p-ethyltoluene and at least one other component selected from C_8 aromatic hydrocarbons and other C_9 aromatic hydrocarbons, which process comprises contacting said mixture with a type Y zeolite adsorbent containing potassium ions at exchangeable cationic sites at adsorption conditions to effect the selective adsorption of said p-ethyltoluene by said adsorbent and to produce a raffinate stream comprising the less strongly adsorbed C_9 hydrocarbons and said C_9 aromatic hydrocarbons and contacting said adsorbent with a desorbent comprising 1,2,3,4-tetrahydronaphthalene or a lower alkyl derivative thereof or an alkyl derivative of naphthalene at desorption conditions to effect the removal of p-ethyltoluene from said adsorbent as an extract stream.

ELECTRICAL

4,956,523
ARMOURED ELECTRIC CABLE WITH INTEGRAL TENSILE MEMBERS

Robert R. Pawluk, Scarborough, Canada, assignor to United Wire & Cable (Canada) Inc., Toronto, Canada and UMR-Luk-ton Inc., Ontario, Canada

Filed May 26, 1989, Ser. No. 356,762
Claims priority, application Canada, May 5, 1989, 598834
Int. Cl.[5] H01B *7/24*
U.S. Cl. 174—107 **8 Claims**

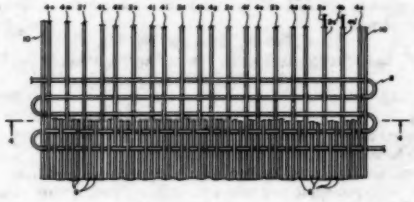


1. An electric cable comprising:
(a) a plurality of separate current carrying insulated conductors,
(b) an inner jacket which is pressure extruded around the insulated conductors to securely grip the insulated conductors, the inner jacket having outwardly extending projections which are deformable under pressure,
(c) at least one longitudinally extending tensile member integrally embedded in the extruded inner jacket,
(d) a protective armour metallic cover around the inner jacket which deforms at least a portion of the deformable projections of the extruded inner jacket, whereby the armour cover securely grips the extruded inner jacket and the extruded inner jacket securely grips each of the insulated conductors and the said at least one tensile member, and
(e) a protective outer jacket which is pressure extruded around the armour cover to securely grip the armour cover.

4,956,524
WOVEN ELECTRICAL TRANSMISSION CABLE

Edward E. Karkow, Glen Arm, Md., assignor to GSI Corporation, Timonium, Md.

Filed May 2, 1989, Ser. No. 346,586
Int. Cl.[5] H01B *7/08*
U.S. Cl. 174—117 M **14 Claims**

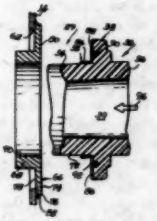


1. A woven electrical transmission cable having controlled impedance comprising:
a plurality of longitudinal conductor wires arranged in a substantially side by side relationship for transmitting signals;
a plurality of longitudinal ground wires coextending in a substantially parallel relationship with said conductor wires and separating said conductor wires;
insulating fiber strands interwoven with said conductor wires and said ground wires to define a woven pattern;
said woven pattern including said insulating fiber strands woven in the warp and filling directions and said conductor wires and said ground wires woven in said woven pattern to have an undulating shape with the same number of undulations in said conductor wires as in said ground wires so that said conductor wires and associated said ground wires define essentially the same path and the lengths of the conductor wires and ground wires are equal; and
a selvage on each side of said cable.

4,956,525
ELECTRICAL INSULATING BUSHING ASSEMBLY, KIT FOR PROVIDING SAME, AND METHOD OF INSTALLING SAME

Robert J. Wilk, Oak Forest, Ill., assignor to G & W Electric Company, Blue Island, Ill.

Filed Jan. 5, 1989, Ser. No. 361,416
Int. Cl.[5] H01B *17/26*
U.S. Cl. 174—152 R **36 Claims**



1. A method of installing an electrical insulating bushing in an electrical device having at least one outer metallic wall defining a bushing-receiving aperture, comprising the steps of:
providing a bushing having a body with opposed ends and electrical terminals at each end;
providing an external flange of electrical insulating material outwardly extending from said bushing body and located intermediate the ends thereof;
providing a metallic interface collar with a mating face for engaging said bushing external flange and an internal wall defining an aperture for telescopically receiving a portion of the bushing;
welding said interface collar to said device wall;
providing an annular gasket;
coating adhesive on at least one of said bushing and said interface collar;
inserting said gasket between said bushing flange and said interface collar;
inserting one end of said bushing through said interface collar;
pressing said bushing flange against said interface collar to compress said gasket therebetween to join said bushing and said interface collars together and to form a fluid-tight seal therebetween; and
allowing said adhesive to cure so as to maintain the joinder and the fluid-tight seal between said bushing flange and said interface collar.

15. A housing assembly for an electrical component comprising:
a closure for at least partly enclosing an electrical component immersed in a dielectric fluid and said closure having an external metallic wall defining an aperture through which an electrical insulating bushing can be inserted;
an electrical-insulating bushing having a body with opposed ends, one of which is disposed within said closure and electrical terminals at each end;
a metallic interface collar having an internal wall defining a central bushing-receiving passageway, a mating face and

an opposed closure-engaging face, said collar welded to said closure metallic wall;

a flange of insulating material outwardly extending from the bushing and pressed against said interface collar;

a resilient gasket between said bushing flange and said interface collar;

a first portion of said bushing extending through said interface collar and said metallic wall; and

said bushing flange and said interface collar being adhesively joined together so as to maintain a compression of said gasket between said bushing flange and said interface collar mating face and so as to form a fluid-tight seal therebetween.

32. A kit for providing an electrical-insulating bushing in an aperture of an external metallic wall of a fluid-containing enclosure of an electrical component immersed in a dielectric fluid, comprising:

a metallic interface collar for welding to portions of the outer metallic wall of the enclosure surrounding said aperture and having an internal bushing-receiving passageway with internal threads;

a bushing having an insulating body with opposed ends, electrically-conducting terminals at each end, an outwardly extending flange with a mating face intermediate the ends, a gasket-receiving recess in said flange extending from the mating face thereof, and external threads formed on an outside surface of said bushing intermediate the ends thereof and adjacent the flange thereof;

a resilient gasket dimensioned to be at least partially received in said flange recess; and

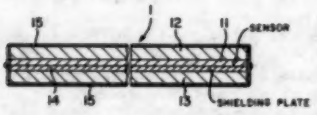
an adhesive for joining the bushing flange and the interface collar together after welding of said collar to the enclosure wall, so as to form a fluid-tight seal therebetween.

4,956,526

DIGITIZER HAVING FLAT TABLET WITH MAGNETIC SHIELD PLATE

Azuma Murakami, and Yasuhiro Fukuzaki, both of Kitakatsushikagun, Japan, assignors to Kabushikikaisha Wacom and NKK Corporation, both of, Japan

Filed Jul. 18, 1989, Ser. No. 381,757
Int. Cl.[5] G08C *21/00*
U.S. Cl. 178—18 **14 Claims**



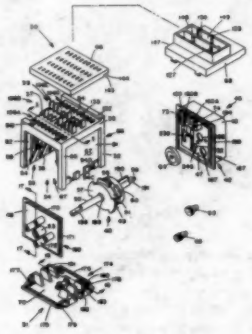
1. A digitizer for determining a coordinate value of a point designated on a given two-dimensional coordinate plane, comprising: a pointing instrument manually operable to designate a point on the given two-dimensional coordinate plane; a tablet including a flat sensor defining the given two-dimensional coordinate plane and operative for transmitting a magnetic signal between the flat sensor and the pointing instrument disposed thereon for detecting the designated point to thereby produce a detection signal, and a shielding plate disposed under the flat sensor for magnetically shielding the flat sensor, the shielding plate being composed of silicon steel containing 4.0 to 7.0 weight % of silicon; and a processing circuit connected to the flat sensor for processing the detection signal to determine the coordinate value of the designated point.

4,956,527

ELECTROMECHANICAL TIMER WITH IMPROVED BLADE RETENTION

Ronald E. Cole, Greenwood, Ind., assignor to Emhart Industries, Inc., Towson, Md.

Filed Mar. 29, 1989, Ser. No. 330,157
Int. Cl.[5] H01H *43/10, 1/00, 9/08*
U.S. Cl. 200—38 R **14 Claims**



1. A timer comprising

a housing;

a plurality of slots passing through said housing in a first direction;

a motor-driven cam supported on said housing;

at least one electrical switch supported on said housing, said switch being responsive to said cam;

a plurality of electrical terminals supported on said housing, at least one of said terminals being connected to said motor and at least one of said terminals being connected to said switch, each of said terminals comprising

a blade;

stop means for engaging said housing to prevent motion of said blade in one direction through said slot; and

first ramp means for engaging said housing at a point along said ramp to prevent motion of said blade in the direction opposite to said one direction.

4,956,528

PUSHBUTTON SWITCH

Alain Jauniere, Paris, and Bernard Juret, Dole, both of France, assignors to ITT Composants et Instruments, Bagnuex, France

Filed Mar. 30, 1989, Ser. No. 331,567
Claims priority, application France, Apr. 6, 1988, 88 04549
Int. Cl.[5] H01H *13/14*
U.S. Cl. 200—314 **9 Claims**

1. An electrical contact switch adapted to be mounted on a printed circuit board comprising:

a base having electrical contacts;

a cover over said base movable in a predetermined direction with respect to said base and including illumination means;

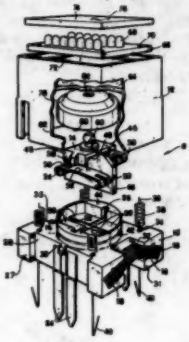
electrical connection means for carrying current to said illumination means;

at least one arched resilient element arranged substantially transversely to said predetermined direction seated in said base, said resilient element cooperating with said movable cover to resiliently resist movement of said cover in said predetermined direction;

a shoe coupled to said cover and lying between said base and said cover;

said shoe having electrical contacts positioned opposite said base contacts to engage said base contacts upon movement of said cover in said predetermined direction;

guide means for guiding and limiting movement of said shoe relative to said bese in said predetermined direction, said



guide means including a groove in said base and a rib extending downwardly from said shoe and being slideable in said groove.

4,956,529

COMPACT SWITCH DEVICE

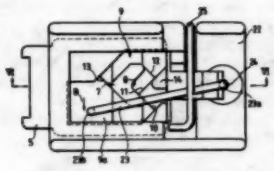
Hiroshi Ueno, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Jan. 25, 1989, Ser. No. 301,303

Claims priority, application Japan, Feb. 8, 1988, 63-15296[U]

Int. Cl.[5] H01H *3/42*

U.S. Cl. 200—524 **4 Claims**



1. A compact switch device comprising:

a casing having an interior, a first open end, and a second end;

an operating member depressibly mounted on the casing for movement within the interior of the casing between a first position and a second position;

a return spring cooperating with the operating member to bias the operating member in the first position;

a cam means mounted on the casing, the cam means having a cam groove with a closed loop configuration, a retaining portion a generally V-shape and a convex guide potion spaced a distance from and opposite to the retaining portion;

a lock pin having first and second ends, the second end being pivotably mounted in the operating member, the first end being received in the cam groove for guided movement responsive to depression of the operating member, the first end being fixedly engageable in the retaining portion to secure the operating member in the second position, and the first end being displaceably guided by the convex guide portion toward the retaining portion, the lock pin including a wire bent in a generally U-shape and including a straight portion intermediate the first and second ends, the lock pin being angularly movable about the second end thereof to permit the first end of the lock pin to ride along the cam groove;

a holder spring for biasing the first end of the lock pin to ride in the cam groove and to move the first end of the lock pin toward the retaining portion when the first end of the lock pin is situated between the retaining portion and the convex guide portion, the holder spring including a wire formed of a generally U-shape defined by two legs and one of the two legs of the holder spring being resiliently held against the straight portion of the lock pin; and

a switching means mounted on the casing to be opened and closed selectively in response to the depressible movement of the operating member.

4,956,530

METHOD OF OPERATION AND DEVICE FOR EVEN HEATING BY MEANS OF MICROWAVES

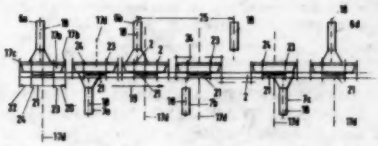
Klaus Koch, Laatzen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hanover, Fed. Rep. of Germany

Filed Sep. 8, 1989, Ser. No. 404,644

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1988, 3830867

Int. Cl.[5] H05B *6/68, 6/78*

U.S. Cl. 219—10.55 B **10 Claims**



1. A method for the even heating of food products in containers, the containers traveling longitudinally on a continuous conveyor through a microwave treatment chamber, the heating being effected by longitudinally spaced microwave input channels positioned above and/or below said conveyor and extending into said treatment chamber, said channels having axial aperture centers and being operatively connected to microwave generators, comprising the steps of:

(a) registering before or during initial entry into the treatment chamber at least the beginning and end of each container positioned on said conveyor, without regard to the spacing between said containers, and transmitting such position information to a computer,

(b) switching on each microwave generator when a predetermined switch-on point of said container passes the axial aperture center of the associated input channel,

(c) switching off each microwave generator when a predetermined switch-off point of said container passes said axial aperture center of said associated input channel, and

(d) determining said switch-on and switch-off points based on the container length, the product to be heated, and the position of the axial aperture center, all of which are set or preset in the computer.

4,956,531

MICROWAVE OVEN WITH ADAPTABLE POWER MODULE

Eckart Braunisch, Kimstad, and Jan Önnegren, Norrköping, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 27, 1989, Ser. No. 372,572

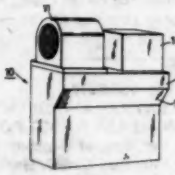
Claims priority, application Sweden, Jul. 6, 1988, 8802528

Int. Cl.[5] H05B *6/64*

U.S. Cl. 219—10.55 B **16 Claims**

1. A microwave oven comprising an oven cavity, a microwave source having an antenna projecting therefrom for feeding HF power into the oven cavity, a power supply device for the supply of power to the microwave source, a fan for cooling components of the power supply device and the microwave

source; the power supply device, the microwave source and the fan being combined into a power module unit comprising a substantially closed envelope containing at least some of said components of the power supply device and haivng an air inlet, an air outlet and an input for AC supply voltage, the envelope having an air channel between the air inlet and the air



outlet for passage of a forced cooling air stream produced by means of the fan, the components to be cooled being arranged in the path of the cooling air stream, the microwave source being mounted as a projecting part of the envelope at the air inlet or air outlet of the envelope and with the antenna projecting from the microwave source, said fan also being mounted as a projecting part of the envelope.

4,956,532

METHOD AND APPARATUS FOR EVEN HEATING OF PRODUCTS BY MEANS OF MICROWAVES

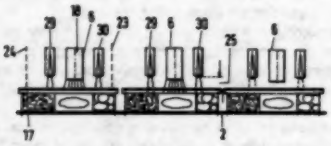
Klaus Koch, Laatzen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover, Fed. Rep. of Germany

Filed Oct. 6, 1989, Ser. No. 419,218

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1988, 3834574

Int. Cl.[5] H05B *6/68, 6/78*

U.S. Cl. 219—10.55 M **9 Claims**



1. A method for the even heating of different products by means of microwave energy, in which the products to be treated are passed on a conveyor belt through a microwave treatment chamber and are contained in either open containers or closed packages permeable to microwave energy supplied by microwave input channels longitudinally spaced along the conveyor belt, comprising the steps of:

(a) registering the beginning and end positions of each container before or during initial entry into the treatment chamber, and transmitting the registration information to a computer,

(b) measuring the temperature of the individual products prior to microwave heating, and transmitting the temperature information to said computer,

(c) creating a microwave energy profile from the measured temperature and from specific product parameters,

(d) inputting microwave energy into each product, according to the profile, at a first station following said temperature measurement,

(e) measuring the surface temperature of each product following step (d), and transmitting such temperature information to the computer,

(f) re-determining the microwave energy profile for each product, based on the last measured temperature and the given specific product parameters,

(g) inputting microwave energy into each product according to the re-determined profile as it passes under the next succeeding input channel, and,

(h) repeating the temperature measurement and microwave input steps until the product has reach its desired, even temperature throughout.

4,956,533

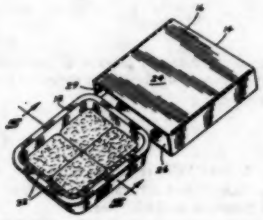
SOLID STATE CERAMIC MICROWAVE HEATING SUSCEPTOR COMPOSITIONS

Jonathan Seaborne, Corcoran, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 56,201, Jun. 1, 1987, Pat. No. 4,810,845. This application Nov. 28, 1988, Ser. No. 276,609

Int. Cl.[5] H05B *6/80*

U.S. Cl. 219—10.55 E **14 Claims**



1. An article for use as a microwave heating susceptor in a microwave radiation field which article will absorb microwave radiation to produce heat and to raise the temperature of the article, comprising:

a microwave absorptive body, said body fabricated from a ceramic composition comprising

(a) a ceramic binder, and

(b) a ceramic susceptor material which absorbs microwave energy and having a neutral lattice charge, and wherein the ceramic composition is unvitrified,

said body having a thickness ranging from about 0.5 to 8 mm.

4,956,534

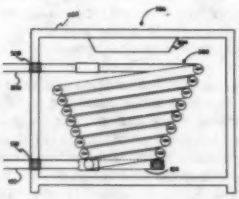
INVERTED FRUSTUM SHAPED MICROWAVE HEAT EXCHANGER AND APPLICATIONS THEREOF

William A. Martin, 124 Elma-McCleary Rd. #38, Elma, Wash. 98541

Filed Apr. 29, 1988, Ser. No. 187,723

Int. Cl.[5] H05B *6/80*

U.S. Cl. 219—10.55 A **15 Claims**



1. A heat exchanger for use with a microwave source comprising:

a microwave—transparent conduit having an inlet opening at one end and an outlet opening at another end, said conduit being shaped so as to form a three dimensional

path of widening perimeter from said inlet to said outlet openings, supply means connected to said inlet opening for channeling a heat conductive medium into said inlet opening, whereby the heat conductive medium may be heated by said microwave source, and exit said outlet opening.

4,956,535

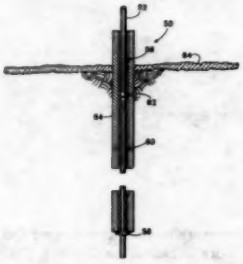
ELECTRODE SYSTEMS FOR IN SITU VITRIFICATION

James L. Buelt; John G. Carter; Eugene A. Eschbach; Vincent F. FitzPatrick; Paul L. Koehmstedt; William C. Morgan; Kenton H. Oma, and Craig L. Timmerman, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Continuation-in-part of Ser. No. 60,253, Jun. 8, 1987, abandoned. This application Oct. 7, 1988, Ser. No. 255,057

Int. Cl.[5] H05B *6/54*

U.S. Cl. 219—10.81 **34 Claims**



1. An electrode for use in the process of in situ vitrification of soil by application of electric current to the soil via said electrode to raise the soil to a high temperature for melting said soil at levels along said electrode, said electrode comprising:

a first electrically conductive electrode shaft member adapted for positioning at least partially below the soil surface and adapted for connection to a source of said current for the purpose of conducting said current to the soil while maintaining its integrity at high temperatures, and

a second electrically conductive sleeve electrode member within which said first conductive electrode shaft member is internally positioned at least along a portion of the length of said first conductive electrode shaft member, said portion of the length of said first conductive electrode shaft member corresponding to a portion thereof as would be located substantially between the soil surface and a location along said first conductive electrode shaft member below the soil surface when said first conductive electrode shaft member is positioned at least partially below the soil surface,

said second conductive sleeve electrode member being formed of a material and having a diameter for providing a higher degree of thermal conduction than exhibited by said first conductive electrode shaft member.

4,956,536

DEVICE FOR PRE-CALIBRATING HOLLOW CYLINDRICAL BODIES IN SEAM WELDING MACHINES

Luigi Pazzaglia, Bologna, Italy, assignor to Cefin S.p.A., Bologna, Italy

Filed Aug. 7, 1989, Ser. No. 389,957

Claims priority, application Italy, Nov. 30, 1988, 3682 A/88

Int. Cl.[5] B23K *11/36*

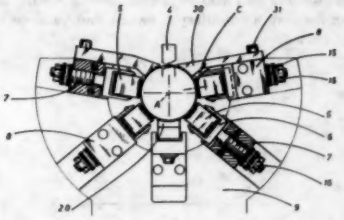
U.S. Cl. 219—64 **20 Claims**

1. A device for precalibrating hollow cylindrical can bodies to be seam-welded by continuously operating machines comprising:

an arm, by and along which rolled can bodies are supported and advanced while assuming cylindrical form, their two longitudinal edges approaching one another and overlapping;

a calibration station at which the forming can body assumes prescribed dimensions and is welded by a pair of electrode rollers located internally and externally of the body, respectively;

a precalibration device, located preceding the calibration station along the feed direction followed by the can bodies, consisting in one or more sets of rollers arranged



around a circumference coaxial with and of diameter substantially equal to that of the can body, of which at least one set consists in a plurality of rollers occupying fixed positions in relation to the feed direction and exhibiting surfaces with a radius of curvature greater than that of the encompassed cylindrical surface, in such a way that as physically small an area as possible is in rolling frictional contact between each roller and the cylindrical body passing through;

a guide of Z section located above the calibration rollers and extending parallel with the feed direction to terminate immediately prior to the pair of electrode rollers, with which the as yet unwelded edges of the can body are brought into contact.

4,956,537

METHOD FOR HINDGAS COVERAGE IN ARC WELDING AND HINDGAS DEVICE FOR CARRYING-OUT THE METHOD

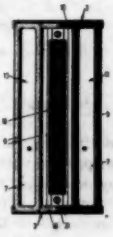
Walter Schnorrer, Ryesgade 40, Aalborg, Denmark

Filed Jun. 21, 1989, Ser. No. 369,658

Claims priority, application Denmark, Jun. 23, 1988, 3472/88; Apr. 24, 1989, 1957/89

Int. Cl.[5] B23K *9/16*

U.S. Cl. 219—74 **32 Claims**



1. A device for isolation of introduced gas in arc welding in which the root or back side of a welded seam is isolated from atmospheric air by placing the device on the side of the root,

which device includes walls that together with the surface of the work piece to be welded or the work pieces to be welded form a substantially closed enclosure enclosing the root of the welded seam and in which a protective gas is conducted through the enclosure during the welding process, characterized in that the device is held against the work piece to be welded by creating a vacuum in one or more chambers in the device, which chambers include a surface of the work piece to be welded for one side and the walls of the chamber for the other sides, and which enclosure includes feed openings for protective gas, further characterized in that the walls have means permitting connection to a source of vacuum, said vacuum chamber being provided with sealing means that may bear against the surface of work piece to be welded, each said vacuum chamber and said enclosure having sealing means in common forming a boundary between said vacuum chamber and said enclosure.

4,956,538

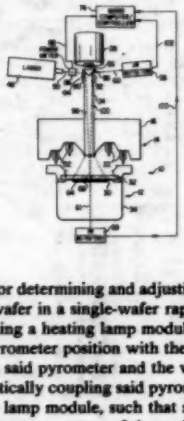
METHOD AND APPARATUS FOR REAL-TIME WAFER TEMPERATURE MEASUREMENT USING INFRARED PYROMETRY IN ADVANCED LAMP-HEATED RAPID THERMAL PROCESSORS

Mehrdad M. Moslehi, Dallas, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Sep. 9, 1988, Ser. No. 242,755

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.6 **38 Claims**



1. Apparatus for determining and adjusting temperature of a semiconductor wafer in a single-wafer rapid thermal processing reactor utilizing a heating lamp module, comprising:

at least one pyrometer position with the heating lamp module between said pyrometer and the wafer;

a light pipe optically coupling said pyrometer and the wafer through the lamp module, such that said pyrometer may determine the temperature of the wafer;

a lamp power supply; and

a controller for adjusting output from the lamp module based on input from said pyrometer, such that the wafer temperature may be adjusted.

4,956,539

LASER PROCESSING METHOD

Yuji Uesugi, Osaka; Masashi Makino, Toyonaka; Yukio Nishikawa, Kobe; Kunio Oshima, and Akihito Shinohara, both of Matsue, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

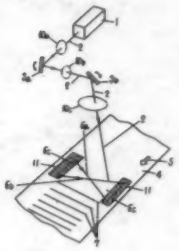
PCT No. PCT/JP87/00480, § 371 Date Apr. 18, 1988, § 102(e) Date Apr. 18, 1988, PCT Pub. No. WO88/00109, PCT Pub. Date Jan. 14, 1988

PCT Filed Jul. 7, 1987, Ser. No. 180,820

Claims priority, application Japan, Jul. 9, 1986, 61-161338; Aug. 7, 1986, 61-186026

Int. Cl.[5] B23K *26/08*

U.S. Cl. 219—121.8 **10 Claims**



1. A laser processing method comprising the steps of:

processing a work, which is running in a direction, by reciprocal way scanning a laser beam and by repeatedly processing substantially parallel processing lines having a given angle to the running direction of said work, provided that the running velocity vector of said work is set as v, the relative processing velocity vector against said work in a first way is set as V_a, the scanning velocity vector of the laser beam on the first way is set as V_1, and the scanning velocity vector of the laser beam on a second way is set as V_2,

scanning the laser beam by determining V_1, V_2, in a manner to hold:

$$V_1 \simeq V_a + v, \; V_2 \simeq -V_a + V, \text{ and}$$

inclining the work in a manner that the angle made by the laser beam and the work is in a range of 87° to 55°.

4,956,540

ARC SPOT WELDING APPARATUS

Mitsuo Kohno, Itami; Masao Sakai, Yokohama; Moritoshi Nagasaka, Ibaragi; Toshihiko Okada, Takatsuki, and Hiroyuki Morimoto, Itami, all of Japan, assignors to Daihen Corporation, Osaka, Japan

Filed Jul. 26, 1989, Ser. No. 385,894

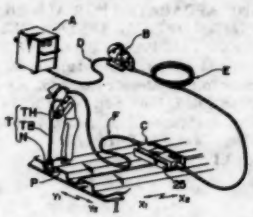
Claims priority, application Japan, Jul. 29, 1988, 63-101888[U]; Nov. 22, 1988, 63-151941[U]; Jan. 11, 1989, 1-001848[U]

Int. Cl.[5] B23K *9/007*

U.S. Cl. 219—127 **5 Claims**

1. An arc spot welding apparatus comprising a welding power supplying unit, a wire feeder connected to the welding power supplying unit by a control cable and an arc spot welding torch connected to the wire feeder by a torch cable which is operable by operating an operation switch arranged on a holder thereof to be held by an operator, said apparatus being characterized in that the welding torch is comprised of a nozzle assembly including a power supply element for supplying electric power to a consumable electrode wire being fed in an axial direction thereof, a baffle having holes for spouting shielding gas and a nozzle surrounding said power supply

element, said baffle and said consumable electrode wire, a torch holder assembly being provided with the operating switch which is operable by an operator while holding said torch holder assembly, a torch body assembly for connecting said nozzle assembly and said torch holder assembly which is formed so as to have a length defined as the distance between



a tip end of the nozzle of said nozzle assembly and a holder portion of said torch holder assembly equal to or longer than 650 mm whereby the operator can operate said welding torch in a standing posture;

wherein said nozzle assembly includes at least one small hole which connects inner and outer spaces of said nozzle assembly at the bottom portion thereof.

4,956,541

CURRENT NOZZLE FOR MIG- AND MAG-WELDING BURNER

Ossi Hiltunen, Box 3099, S-19500 Märsta, Sweden

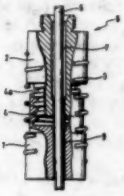
PCT No. PCT/FI88/00028, § 371 Date Aug. 23, 1989, § 102(e) Date Aug. 23, 1989, PCT Pub. No. WO88/06072, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 23, 1988, Ser. No. 399,470

Claims priority, application Finland, Feb. 23, 1987, 870749; Feb. 11, 1988, 880625

Int. Cl.[5] B23K *9/24*

U.S. Cl. 219—137.61 **7 Claims**



1. A current nozzle for a mig- or a mag-welding burner comprising a nozzle body having a nozzle orifice extending therethrough for the passage of welding wire, said wire having a longitudinal axis and passing longitudinally through said nozzle orifice with wear of an adjacent nozzle orifice wear surface during welding operation, and means for providing eccentric relative movement between the nozzle orifice and the wire along its longitudinal axis to maintain the wire in contact with said wear surface of the nozzle orifice.

4,956,542

MIRROR DEFOGGER

Robert Prosser, P.O. Box 4425, Carlsbad, Calif. 92008

Continuation of Ser. No. 242,877, Sep. 12, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 313,062

Int. Cl.[5] H05B *3/84*

U.S. Cl. 219—219 **9 Claims**

1. An improved electric heating source fastened to a surface of a mirror for supplying heat to reduce the formation of moisture on the mirror surface wherein the improvement comprises:

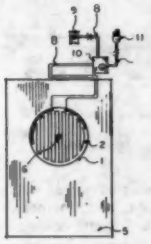
a. a heating element adhesively mounted to the surface of the mirror where the heating element is capable of conforming to any given geometrical shape;

b. a thermist or centrally mounted within and connected to the heating element to provide a means of electronic temperature control to protect from overheating of the heating elements;

c. an adhesive coating on both sides of the heating element and protected by a removable covering sheet of material;

d. an electronic control module mounted in the proximity of the mirror and intimately connected thereto;

e. a manually operable electrical activation switch to activate the heating element;



f. an automatically timed electric de-activation function switch which manages the control module;

g. a humidistat that is remotely situated from the heating element and which sends a signal that is humidity activated through airwaves and a means for receiving the signal from the humidistat to activate the heating element;

h. the humidistat being operable with DC and AC voltage;

i. a converter to selectively convert alternating current from an AC power source to direct current; and

j. a system circuit electrically connecting the manually operable activation switch, the humidistat, the automatically timed electric de-activation function switch, the electronic control module, the converter, the heating element, the thermistor and the AC power source.

4,956,543

BRANDING DEVICE HAVING CERAMIC TYPE BLOCK WITH EMBEDDED ELECTRIC HEATING ELEMENT

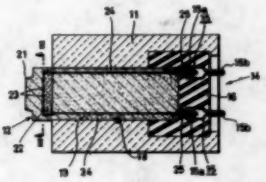
Masato Shibata, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Tokushima, Japan

Filed Apr. 21, 1988, Ser. No. 184,562

Claims priority, application Japan, Apr. 24, 1987, 62-102295

Int. Cl.[5] H05B *1/00, 3/00*; B44B *5/00*

U.S. Cl. 219—227 **3 Claims**



1. A branding device comprising:

a holder, and

an elongated type block made of a ceramic material and having one end removably attached to the holder and a

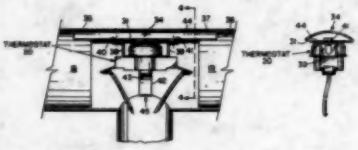
forward end projected from the holder, the type block having a branding indicia on the projected forward end face, a ceramic plate embedded in the forward end of said type block, and an electrically resistive heat generating member printed as a pattern on a surface of said ceramic plate facing the forward end of said type block for heating the branding indicia.

4,956,544

OVERHEAT PROTECTED ELECTRIC CARTRIDGE HEATER

Samuel S. Sayward, Jr., Danvers, Mass., assignor to Hotwatt Inc., Danvers, Mass.

Filed Jul. 26, 1988, Ser. No. 224,470
Int. Cl.[5] H05B *1/02, 3/82;* F24H *1/20*
U.S. Cl. 219—335 **12 Claims**



1. A cartridge heater having an overheat protection device, for use in a steam table tank, the heater comprising:

a riser tube attached to the inside of the tank;

a tubular elongate sheath having a curved inner surface attached to said riser tube;

an electric heater element inside said sheath;

a heat transfer member having an enlarged, curved surface complementary to the curved inner surface of said sheath for engaging the inner surface of said sheath in an area of said sheath remote from said heater element;

means urging said heat transfer member into close, intimate, thermal contact with the inner surface of said sheath; and

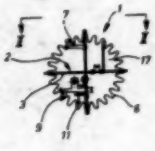
switch means for turning the heater element on and off, said switch means including a thermally sensitive element responsive to a rise in the temperature of said heat transfer member above a predetermined level for actuating said switch means to interrupt current flow to the heater element to prevent it from overheating.

4,956,545

HEATER WITH TAP

Helmut Ohamacht, Kandel; Karl-Heinz Nauerth, Erlenbach, and Klaus Meywald, Kandel, all of Fed. Rep. of Germany, assignors to Fritz Eichenauer GmbH & Co. KG, Kandel, Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 153,917
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1987, 8701993[U]
Int. Cl.[5] H05B *3/02;* F24H *3/04*
U.S. Cl. 219—541 **9 Claims**



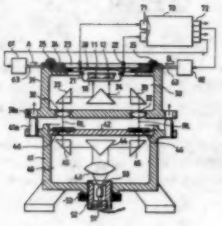
1. Electric heater with at least one insulating carrying part and at least one heat conductor carried by the carrying part and with at least one tap for tapping a reduced voltage as compared with a voltage applied to the heating conductor, wherein the at least one carrying part has slots through which pass feet means of the at least one tap for fixing the at least one tap to the carrying part, and wherein a length of the slots is greater than a width of the feet means of the at least one tap.

4,956,546

METHOD AND APPARATUS FOR ALIGNING IMAGE SENSORS WITH AN OPTICAL SYSTEM IN AN OPTICAL APPARATUS

Takashi Nishibe, and Shotaro Yokoyama, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Jul. 7, 1989, Ser. No. 376,514
Claims priority, application Japan, Aug. 4, 1988, 63-194910
Int. Cl.[5] G01J *1/20*
U.S. Cl. 250—203.1 **11 Claims**



1. A method of aligning a plurality of image sensors with an optical system in an optical apparatus, each of the plurality of image sensors being spaced apart from the other image sensors and having at least one photosensor for receiving light, comprising the steps of:

generating an alignment light beam from a light source disposed adjacent the optical system;

splitting the alignment light beam into a plurality of reference light beams, each of the reference light beams corresponding to a different one of the plurality of image sensors;

focusing each of the reference light beams on a specified one of the at least one photosensors in the corresponding one of the image sensors such that the cross-sectional size of each of the plurality of reference light beams is substantially equal in size to size of the corresponding specified photosensor so that a maximum amount of light is received by each of the specified photosensors at times when the plurality of image sensors are aligned with the optical system;

measuring the amount of light received by the specified photosensors; and

moving the position of the plurality of image sensors relative to the optical system for alignment in response to said measured amount of light received by the specified photosensors until said measured amount of light reaches a maximum.

4,956,547

APPARATUS FOR SENSING INFORMATION ON BOTH SIDES OF DOCUMENTS

Kikuo Mita, Tokyo, Japan, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,696
Claims priority, application Japan, Sep. 28, 1988, 63-242865
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—208.1 **6 Claims**

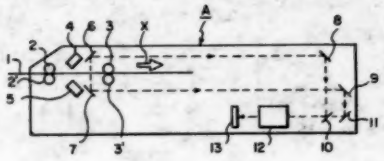
1. Apparatus for sensing information existing on the top and bottom surfaces of a document comprising:

a one-dimensional image sensor;

means for feeding a document relative to said image sensor;

first and second light sources respectively illuminating the top and bottom surfaces of the document;

light intermitting means for alternately passing light reflected by one of the surfaces of such document and then light reflected by the other surface thereof; and



an optical system operating to focus the beams of light reflected by the respective surfaces of the document onto said image sensor.

4,956,548

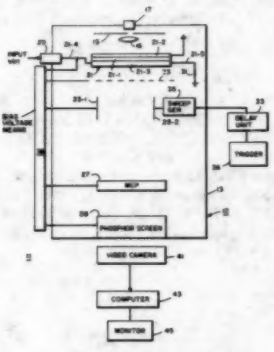
ULTRAFAST OSCILLOSCOPE

Robert R. Alfano, 3777 Independence Ave., Bronx, N.Y. 10463, and Ping P. Ho, 240-42 69th Ave., Douglaston, N.Y. 11362

Filed Jan. 6, 1989, Ser. No. 294,182

Int. Cl.[5] H01J *31/50*

U.S. Cl. 250—213 VT **13 Claims**



1. An oscilloscope for use in generating a time resolved profile of an ultrafast voltage signal comprising:

(a) means for generating a constant beam of light;

(b) a streak camera including a housing having disposed therein:

(i) a transmission line photocathode upon which said beam of light impinges,

(ii) means connected to said transmission line photocathode for receiving a voltage signal to be examined,

(iii) whereby a number of electrons will be emitted from said transmission line photocathode as the voltage signal and the beam of light temporally and spatially intersect on said photocathode, the number of emitted electrons being proportional to the intensity of the voltage signal,

(iv) an accellerating mesh for accelerating the emitted electrons away from the photocathode,

(v) means for angularly deflecting the electrons as a function of time,

(iv) electron multiplication means for performing electron multiplication on the deflected electrons,

(v) a phosphor screen upon which the multiplied electrons impinge to create a light image proportional in intensity to the number of electrons incident thereto,

(vi) bias voltage means connected to said photocathode, said accelerating mesh, said means for angularly deflecting the electrons as a function of time, said multiplication means, and said phosphor screen, for creating a potential difference sufficient to convey the electrons from said transmission line photocathode to said phosphor screen;

(c) a video camera focused on said phosphor screen for recording the light image appearing thereon;

(d) computer means for digitizing and processing and/or storing the output of the video camera, and

(e) a monitor connected to said computer means for displaying the time resolved profile of the voltage signal.

4,956,549

OPTICAL SENSING SYSTEMS

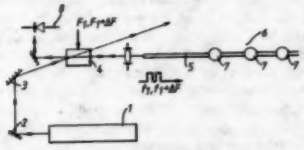
Michael L. Henning, Somerset, and Christopher Lamb, Dorset, both of England, assignors to Plessey Overseas Limited, Ilford, England

Filed Jul. 13, 1988, Ser. No. 218,168

Claims priority, application United Kingdom, Jul. 16, 1987, 8716776

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.14 **9 Claims**



1. An optical sensing system comprising:

a single continuous wave light source;

a series of phase shifting switching devices comprising a first phase shifting switching device proximate said light source, a plurality of intermediate phase shifting switching devices, and a last phase shifting switching device, distant from said light source, said series of phase shifting devices being positioned along a line aligned with said light source to receive light from said light source; and

a plurality of driving means each connected to one of the phase shifting switching devices for driving said devices with pulses at different frequencies;

each of said phase shifting devices producing output pulses of different frequencies in different deflected directions and being subsquentially operated by their respective driving means so that the light from the continuous wave light source passes straight through said first phase shifting switching after being driven by its respective driving means device and sequentially through each of said intermediate phase shifting switching devices after each is driven by its respective driving means to the last phase shifting switching until the last phase shifting switching device has produced output pulses whereupon the first device is reoperated for the generation of pulses.

4,956,550

SUB-SEA FIBER OPTIC CABLE LOCATION APPARATUS WITH A PLURALITY OF TRANSPONDER MEANS

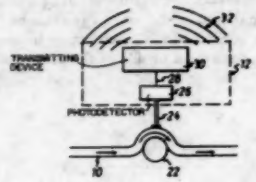
Geoffrey S. Edwards, Grange-over-Sands, and Robert S. Tebble, Wilmslow, both of England, assignors to Oxley Developments Company Limited, London, England

Filed Jan. 13, 1989, Ser. No. 296,785

Claims priority, application United Kingdom, Jan. 16, 1988, 8800972

Int. Cl.[5] H01J 5/16; G02B 6/02; G01N 21/00

U.S. Cl. 250—227.15 6 Claims



1. In a sub-sea optical fiber system having a main optical fiber cable, an apparatus used in searching for location of the cable, comprising:

(a) means, disposed at a plurality of predetermined locations on said main optical fiber cable, each for tapping off a small portion of a light signal carried by said main optical fiber cable; and

(b) a plurality of transponder means, each for radiating a signal, each being disposed on said main optical fiber cable at respective ones of said predetermined locations and each including

(i) means for converting the tapped off small portion ofthe light signal into an electrical signal for activating said transponder meaan, and

(ii) means, responsive to said electrical signal, for controlling the radiation of the signal from said transponder means, said control meaan being activated only upon receipt of a predetermioned coded instruction in said tapped portion of the light signal whereby, of the plurality of transponder means disposed on said main optical fiber cable, only selected ones of the plurality of transponder meaan in a region of the cable being searched need be activated.

4,956,551

SENSOR FOR CONSUMPTION MEASUREMENTS IN A HOUSEHOLD MEASURING SYSTEM

Horst Repschläger, Aachen, and Heinz Riemer, both of Fed. Rep. of Germany, assignors to Infas Institut Fur Angewandte Sozialwissenscheft GmbH, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 276,521

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740974; Dec. 12, 1987, 3742249

Int. Cl.[5] G01D 5/30; H01J 5/02

U.S. Cl. 250—231.14 7 Claims

1. Sensor, for consumption measurements in a household consumption measuring system having a measuring device, such as at least one of an electricity meter, a gas meter, a water meter and the like, with a display element placed behind a transparent cover plate, said sensor comprising a housing with an outlet side and a reflex photoelectric barrier emitter and a reflex photoelectric barrier receiver arranged next to each other in said housing on the outlet side thereof, wherein the housing of the sensor is constructed for mounting of its outlet side on the cover plate of the consumption measuring devices, wherein the position of the reflex photoelectric barrier emitter and of the reflex photoelectric barrier receiver is adjustable in said housing, both mutually and relative to said outlet side of the housing for enabling the reflex photoelectric barrier emitter and reflex photoelectric barrier receiver to be operatively aligned with the display element of the consumption measuring device, wherein the outlet side of the housing is covered by a transparent outlet plate, and wherein the transparent outlet

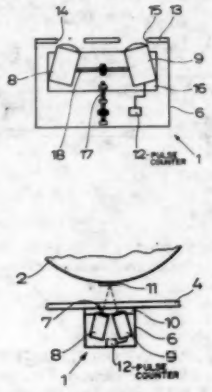


plate is provided, on its inner side, with cup-shaped recesses that are matched to emitting and receiving surfaces of the reflex photoelectric barrier emitter and reflex photoelectric barrier receiver, respectively, said recesses serving as a means for reducing optical losses.

4,956,552

APPARATUS FOR EFFECTING THE SWEEP OF A BEAM OF LIGHT STRICTLY PLANE AND PARALLEL TO A GIVEN AXIS

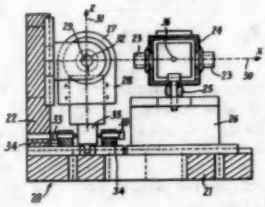
Michel Paramythioti, Lamorlaye, France, assignor to Societe a Responsabilite Limitee dite MENSI, Paris, France

Filed May 17, 1989, Ser. No. 352,864

Claims priority, application France, May 19, 1988, 88 06702

Int. Cl.[5] G02B 26/02

U.S. Cl. 250—236 6 Claims



1. Apparatus for effecting a strictly planar and parallel to a given axis scanning a beam of light comprising:

(a) a scanning mirror having an axis of rotation substantially perpendicular to said given axis and having its plane substantially containing said axis of rotation;

(b) an optical device arranged substantially in the plane containing said given axis and perpendicular to said axis or rotation;

(c) first adjustment means for adjusting the angle of incidence of the beam of light with respect to a predetermined plane containing said given axis and substantially perpendicular to said axis of rotation of the mirror; and

(d) second adjustment means for adjusting the inclination of

said axis of rotation of the mirror with respect to said predetermined plane.

4,956,553

OPTICAL ENCODER WITH VARYING GRATING PITCH

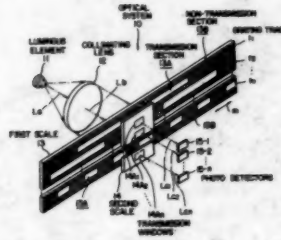
Keiji Matsui, Aichi, Japan, assignor to Kabushiki Kaisha Okuma Tekkosho, Aichi, Japan

Division of Ser. No. 251,089, Sep. 29, 1988. This application Jul. 3, 1989, Ser. No. 374,922

Claims priority, application Japan, Sep. 30, 1987, 62-246726; Sep. 30, 1987, 62-246727; Oct. 27, 1987, 62-271530

Int. Cl.[5] H01J *3/14*; G01D *5/34*

U.S. Cl. 250—237 G **15 Claims**



1. An optical encoder comprising:

light source means for emitting coherent parallel light;

a scale having a grating track for diffracting parallel light emitted from said light source means, said grating track having a plurality of linear adjacent gratings extending in a lengthwise direction, each of said plurality of linear adjacent gratings extending in a widthwise direction to define a pitch, and each having a non-transmitting section and an adjacent transmitting section extending in said lengthwise direction;

wherein an aperture ratio defined by a ratio between a width of said transmitting portion and said pitch is substantially constant for each of said plurality of linear adjacent gratings of said grating track;

wherein said pitch of each of said plurality of linear adjacent gratings of said grating track varies along said grating track;

light spot position detecting means for receiving positive and negative diffracted light beams of a same order from the parallel light diffracted by said grating track, and for detecting light spot positions of said positive and negative diffracted light beams of the same order, and for converting the thus detected light spot positions into representative electrical signals.

4,956,554

PYROELECTRIC INFRA-RED DETECTORS AND THEIR METHOD OF MANUFACTURE

Geoffrey Baker; Roger Pearce, both of Southampton, and Paul L. Williamson, Shepperton, all of England, assignors to U.S. Philips Corp., New York, N.Y.

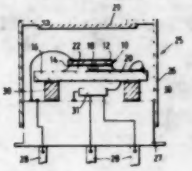
Filed Jan. 26, 1989, Ser. No. 302,716

Claims priority, application United Kingdom, Mar. 2, 1988, 8804959

Int. Cl.[5] H01L *37/00*

U.S. Cl. 250—338.3 **9 Claims**

1. A pyroelectric infra-red detector comprising a substantially planar pyroelectric element onto which infra-red radiation to be detected is directed, and which is supported in spaced and substantially parallel relationship over the surface of a body acting as a heat sink, the element and the body being thermally coupled, characterized in that a non-hardening,



thermally conductive, non-gaseous medium is present between the opposing faces of the pyroelectric element and the body.

4,956,555

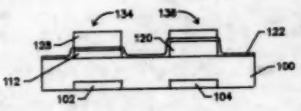
MULTICOLOR FOCAL PLANE ARRAYS

Frank J. Woodberry, Oxnard, Calif., assignor to Rockwell International Corporation, Thousand Oaks, Calif.

Filed Jun. 30, 1989, Ser. No. 374,412

Int. Cl.[5] G02B *5/20*; G01J *3/36*

U.S. Cl. 250—339 **1 Claim**



1. A multicolor focal plane array for detecting and distinguishing between incoming electromagnetic radiation within a first band of wavelengths and incoming electromagnetic radiation within a second band of wavelengths, comprising:

a substrate;

a two dimensional array of detectors disposed on the substrate and responsive to electromagnetic radiation within a predetermined range of wavelengths including the first and second wavelength bands;

a first multilayer thin film filter disposed on the substrate and interposed between the incoming radiation and a first subset of the detectors in the array to prevent radiation outside of the first wavelength band from reaching the detectors in the first subset, the first filter including a first dielectric/thin metal/dielectric layer combination, the thicknesses of the dielectric layers in the first filter combination being adjusted to select the first wavelength band; and

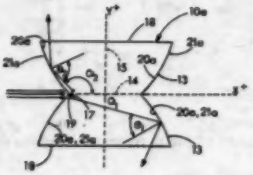
a second multilayer thin film filter disposed on the substrate and interposed between the incoming radiation and a second subset of the detectors in the array to prevent radiation outside of the second wavelength band from reaching the detectors in the second subset, the second filter including a second dielectric/thin metal/dielectric layer combination, the thicknesses of the dielectric layers in the second filter combination being adjusted to select the second wavelength band,

thereby rendering the detectors in the first subset sensitive to radiation within the first wavelength band and the detectors in the second subset sensitive to radiation within the second wavelength band, the first and second filters being substantially identical except for the thicknesses of two layers within each filter.

4,956,556
RADIATION SCINTILLATION DETECTOR

Jeffrey L. Radtke, Madison, Wis., assignor to Siemens Analytical X-Ray Instruments, Inc., Madison, Wis.

Filed Nov. 14, 1988, Ser. No. 271,239
Int. Cl.[5] G01T 1/20, 1/203
U.S. Cl. 250—368 20 Claims



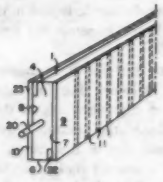
1. A radiation scintillation detector comprising:

a solid body of rotation about a central axis, the body formed of a scintillator medium having a particular index of refraction and including: at least one point of most probable light emission within the body near where radiation is to be received by the detector; at least one internal reflective surface which has a curvilinear axial cross-section wherein substantially any line segment originating from an area in proximity to the point of most portable light emission and ending on the internal reflective surface anywhere along that surface has an angle of incidence to said surface at least as great as a critical angle of incidence determined by the scintillator medium, a surrounding medium adjacent to the body along the internal reflective surface, and a wavelength of the light emitted by the scintillator medium, so that substantially any light originating from the area in proximity to the point of most probable light emission which intersects the internal reflective surface is totally reflected internally; and a planar surface through which the light is substantially transmitted out of the body, the internal reflecting surface having decreasing taper as it approaches the planar surface.

4,956,557
DOSIMETER FOR IONIZING RADIATION

Hugo Vlasbloem, Maasland, Netherlands, assignor to B.V. Optische Industrie 'De Oude Delft', Delft, Netherlands

Continuation-in-part of Ser. No. 931,539, Nov. 14, 1986. This application Feb. 15, 1989, Ser. No. 311,107
Claims priority, application Netherlands, Nov. 15, 1985, 8503153
Int. Cl.[5] G21K 1/04; G01T 1/185
U.S. Cl. 250—385.1 32 Claims

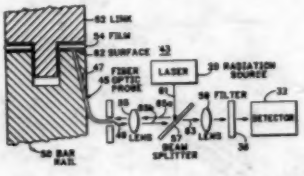


1. A dosimeter for ionizing radiation comprising a casing defining a gas-filled measuring chamber in which there is provided electrode elements and wherein said casing is provided with at least one entry window for the ionizing radiation, characterized in that said casing is of an oblong shape defining an oblong measuring chamber, said casing including at least two opposed side walls of a material transparent to ionizing radiation, an inner surface of one side wall being provided with wire electrodes extending essentially longitudinally to said oblong measuring chamber and an inner surface of another side wall being provided with a plurality of strip-like electrode elements essentially transversely to said oblong measuring chamber.

4,956,558
SYSTEM FOR MEASURING FILM THICKNESS

Charles R. Batishko, West Richland; Leslie J. Kirihara; Timothy J. Peters, and Donald E. Rasmussen, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Mar. 16, 1989, Ser. No. 324,086
Int. Cl.[5] G01N 21/64
U.S. Cl. 250—461.1 29 Claims



1. A method for measuring the thickness of a thin film of material on a surface of a body, said film having fluorescent properties, comprising the steps of:

illuminating a section of said film with excitation energy suitable for stimulating fluorescence in the material of the film;

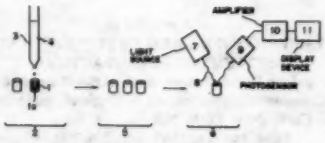
measuring from within said body underneath the surface upon which said film resides the intensity of the fluorescent light produced over a limited area within said section of film; and

correlating said intensity with the intensities of fluorescent light produced by established film thicknesses in order to determine the thickness of said film.

4,956,559
METHOD OF DETECTING RADIOACTIVE SUBSTANCE

Hisashi Shiraishi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 804,323, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 614,635, May 29, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 6,925
Claims priority, application Japan, May 27, 1983, 58-93600; Jun. 10, 1983, 58-103634; Jun. 10, 1983, 58-103635
The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.
Int. Cl.[5] G01T 7/02, 1/167
U.S. Cl. 250—484.1 30 Claims



1. A method of detecting radioactive substance in a liquid sample which comprises the steps of:

(1) supplying a radiation-measuring instrument having a stimulable phosphor covered with a polymer material with the liquid sample continuously or intermittently;

(2) keeping said measuring instrument in contact with the liquid sample for a given period of time to cause the instru-

ment to absorb at least a portion of radiation energy emitted by the radioactive substance in said liquid sample; and

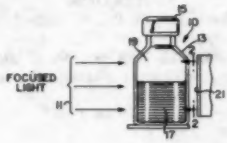
(3) irradiating said measuring instrument with an electromagnetic wave to release the radiation energy stored in the instrument as stimulated emission, and photoelectrically detecting the stimulated emission to measure radioactivity of said liquid sample sequentially.

4,956,560

LIQUID LEVEL DETECTOR SYSTEM WITH FILL-LEVEL SIGNATURE DETECTION

Bruce D. Smith, Jr., and Thomas A. Stalnaker, both of West Chester, Pa., assignors to The West Company, Phoenixville, Pa.

Filed Feb. 3, 1989, Ser. No. 306,795
Int. Cl.[5] G01N *21/49*
U.S. Cl. 250—577 **23 Claims**



1. Apparatus for checking the fill level of a vial, comprising:

locating means for indicating the presence of a vial in a predetermined location;

light sensing means for measuring the amount of light being passed through said vial at said location including a light source, a lens for focusing said light and remote sensing means including a photo diode for receiving said focused light and an amplifier to produce a signal from said diode proportional to the amount of material in said vial;

said signal being a wave form of the energy transmitted through said vial from said light source and having a minimum and maximum sensor output value which provides a signature for the specific fill level of said vial; and

response means for receiving said proportional signal and generating a response.

4,956,561

SMART POWER CONNECTOR

Antanios B. Tamer, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Dec. 27, 1988, Ser. No. 290,222
Int. Cl.[5] H02G *1/00*; H01R *9/0*
U.S. Cl. 307—10.1 **22 Claims**

1. An electrical connector (10) for connecting a plurality of peripheral devices to a vehicular power network (12), said connector (10) comprising:

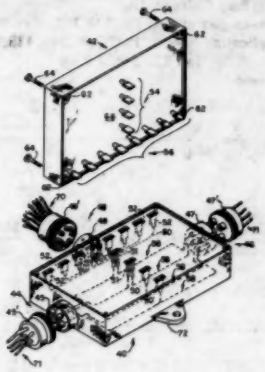
a printed circuit board (66) having electrical components (78) mounted thereon;

a heat conducting element (80) being in heat transfer relation with respect to at least one of said electrical components (78), said heat conducting element (80) being mounted on said printed circuit board (66);

first housing portion (40) having first and second connecting means (44,46) for electrical connection to said vehicular network (12), and third connecting means (48) for electrical connection to said plurality of peripheral devices;

second housing portion (42) retaining said printed circuit board (66) and heat conducting element (80), said second housing portion (42) being adapted to overlie said first housing portion (40); and

a plurality of electrical terminals (54,56) being disposed in said second housing portion (42) and adapted for electrical connection to said first, second and third connecting means (44,46,48) when said first and second housing portions (40,42) are contiguous and in electrical connection, said first, second and third connecting means (44,46,48) each having first and second end portions



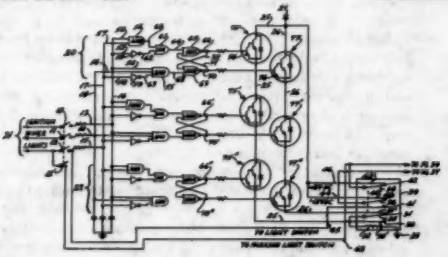
(45,45',47,47',49,49'), said first end portions (45,47,49) being securely mounted to said first housing portion (40), and said second end portions (45',47',49') being detachable from said first end portions (45,47,49).

4,956,562

HEADLIGHT, WINDSHIELD WIPER CONTROL SYSTEM

Charles E. Benedict, Tallahassee, and Donald M. Stumpf, Panama City, both of Fla., assignors to Benedict Engineering Co. Inc., Tallahassee, Fla.

Continuation of Ser. No. 329,304, Mar. 27, 1989, abandoned.
This application Sep. 15, 1989, Ser. No. 409,612
Int. Cl.[5] H02G *3/00*
U.S. Cl. 307—10.8 **23 Claims**



1. An automatic system for controlling the turning on of vehicle headlights when ignition and windshield wipers are turned on and for keeping them on when the wipers are turned off, comprising on-off switches for the ignition, wipers and headlights, a first relay circuit, a relay switch, said relay switch having means for connecting said headlights to power supply means, said first relay circuit being alternately connectable to actuating means for said relay switch which governs the connection of said headlights to said power supply means, said power supply means connected to said first relay circuit, control means for said first relay circuit, logic circuit means connecting the outputs of said ignition and headlight switches to the control means for said first relay circuit, said logic circuit means connecting the outputs of said ignition, wipers and headlights to form a latching circuit, said latching circuit producing a signal output to activate said control means for said first relay circuit to turn the headlights on when the ignition and wiper switches are turned on, said latching circuit continuing to produce such signal output when the wiper switch is turned off.

4,956,563

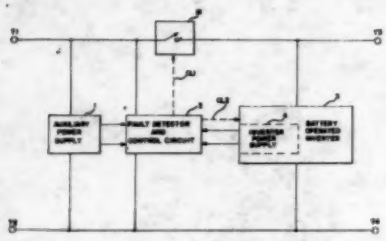
STANDBY POWER SUPPLY

Louis W. Schornack, Park Ridge, Ill., assignor to Perma Power Electronics, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 118,257, Nov. 9, 1987. This application Nov. 9, 1987, Ser. No. 118,789

Int. Cl.[5] H02J 9/00

U.S. Cl. 307—66 **13 Claims**



1. A power supply for providing electrical power to a load in case of power line voltage failure comprising:

input terminal means adapted for connection to electrical power lines;

load terminal means adapted for connection to said load;

battery-operated inverter means for providing electrical power to said load terminal means;

fault detector means responsively coupled to said input terminal means for producing a low-voltage-indicating condition responsively to the presence of a power line voltage having an amplitude below a given value and for producing a normal-voltage-indicating condition responsively to the presence of a power line voltage having an amplitude above said given value;

control switching means responsively coupled to said fault detector and operable to a line-power state responsively to the presence of said normal-voltage-indicating condition and to a battery-power state responsively to the presence of said low-voltage-indicating condition and including means for transferring electrical power from said input terminal means to said load terminal means and operating said inverter means to an inactive condition in said line-power state and means for interrupting said transfer and operating said inverter means to an active condition providing electrical power to said load terminal means in said battery-power state;

disabling means for preventing transition of said control switching means from said line-power state back to said battery-power state for a given period of time after transition of said fault detector means from a low-voltage-indicating condition to a normal-voltage-indicating condition so that transient inrush currents into said load producing a momentary low-voltage condition on said power lines do not cause actuation of said control switching means back to said *battery-power state.*

4,956,564

ADAPTIVE SYNAPSE CELL PROVIDING BOTH EXCITATORY AND INHIBITORY CONNECTIONS IN AN ASSOCIATIVE NETWORK

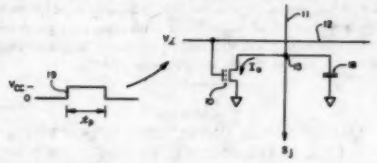
Mark A. Holler, Palo Alto; Simon M. Tam, Redwood City, and Hernan A. Castro, Shingle Springs, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Jul. 13, 1989, Ser. No. 379,933

Int. Cl.[5] H03K 19/21

U.S. Cl. 307—201 **15 Claims**

1. In an associative network, a synapse cell for providing a weighted connection between an input voltage line and an output summing line having an associated capacitance, said cell comprising a floating-gate transistor having a control gate coupled to said input voltage line, a drain coupled to a node of said output summing line, and a floating-gate for storing a charge corresponding to said weighted connection, said transistor producing a current in response to a voltage pulse of a certain duration being applied to said input voltage line, said



current discharging said capacitance thereby lowering the voltage at said node by an amount directly proportional to the product of said certain duration and said charge.

4,956,565

OUTPUT CIRCUIT WITH DRIVE CURRENT LIMITATION

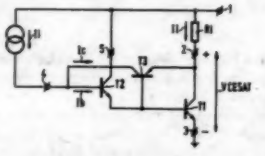
Johannes P. M. Bahlmann, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Apr. 12, 1989, Ser. No. 337,021

Claims priority, application Netherlands, Apr. 28, 1988, 8801103

Int. Cl.[5] H03K 17/00

U.S. Cl. 307—254 **1 Claim**



1. A transistor arrangement comprising an output transistor of a first type and having an emitter, a base and a collector and having its emitter coupled to a reference potential, a driving transistor of said first type having an emitter, a base and a collector and having its emitter coupled to the base of the output transistor and its collector coupled to a power supply potential, and a limiting transistor of said first type having an emitter, a base and a collector and having its emitter coupled to the collector of the output transistor, its collector coupled to the base of the drive transistor for limiting a drive current applied to the base of the driver transistor, and its base coupled to the base of the output transistor.

4,956,566

CIRCUIT CONFIGURATION WITH A GENERATOR SYSTEM FOR PATH- OR ANGLE-DEPENDENT SIGNALS

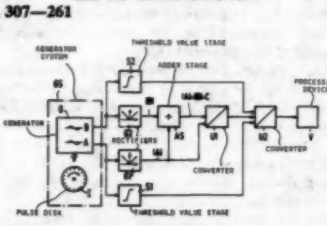
Juergen Rupp, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 9, 1989, Ser. No. 295,238

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802549

Int. Cl.[5] H03K 5/00, 5/01

U.S. Cl. 307—261 **4 Claims**



1. A circuit arrangement adapted to be coupled to a generator system supplying two path- or angle-dependent sinusoidal signals shifted with respect to phase by 90° ed, comprising first

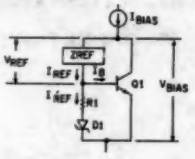
and second rectifiers, the first signal being supplied to the first rectifier and the second signal being supplied to the second rectifier, a summation circuit, output signals of the first and second rectifiers being coupled to inputs of the summation circuit, and a converter receiving an output signal of the summation circuit and an output signal of the second rectifier, said converter providing an output signal corresponding to a quotient of the output signal of the second rectifier circuit and the output signal of the summation circuit, said output signal of the converter having a magnitude substantially proportional to the respective path or angle during a quarter period of the sinusoidal signals.

4,956,567

TEMPERATURE COMPENSATED BIAS CIRCUIT

Steven A. Hunley, Arlington, and Kevin Ovens, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 13, 1989, Ser. No. 310,275
Int. Cl.[5] H03K 17/14
U.S. Cl. 307—310 **20 Claims**



1. A temperature compensated voltage multiplier comprising:

a transistor having a base-emitter junction with a first forward voltage drop as a function of current and a first temperature coefficient;

a first resistance and a diode coupled in series to said base, said diode having a second forward voltage drop as a function of current and a second temperature coefficient, said second forward voltage drop being less than said first forward voltage drop so that the voltage drop across said first resistance is established by and proportional to the difference between said first and second forward voltage drops and the temperature coefficient of said voltage drop is proportional to the difference between said first and second temperature coefficients; and

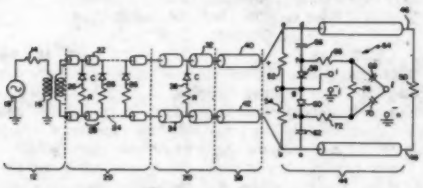
a second resistance having one end coupled to said base and another end coupled to a collector of said transistor.

4,956,568

MONOLITHIC SAMPLER

Chung-Yi Su, Milpitas; Michael R. Ty Tan, Mountain View, and William J. Anklam, Santa Rosa, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 8, 1988, Ser. No. 281,423
Int. Cl.[5] H03K 5/12, 17/04, 17/74
U.S. Cl. 307—352 **8 Claims**



1. A sampler circuit comprising:

a means for providing a signal from a local oscillator;

a means for generating shock waves coupled to said means for providing a local oscillator signal; said means for generating shock waves including a nonlinear transmission line spanned by a plurality of varactors; and

a means for sampling an input signal coupled to said means for generating shock waves, said means for sampling including:

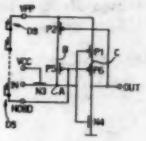
a pair of sampling capacitors coupled to a pair of sampling diodes and an IF output network that includes a positive terminal and a grounded terminal which together produce an IF sampled output.

4,956,569

CMOS LOGIC CIRCUIT FOR HIGH VOLTAGE OPERATION

Marco Olivo, Bergamo; Luigi Pascucci, Sesto S. Giovanni; Carlo Riva; Paolo Rosini, both of Monza, and Corrado Villa, Sovico, all of Italy, assignors to SGS-Thomson Microelectronics S.R.L., Italy

Filed Jun. 30, 1989, Ser. No. 373,203
Claims priority, application Italy, Jul. 6, 1988, 83646 A/88
Int. Cl.[5] H03K 17/10
U.S. Cl. 307—443 **4 Claims**



1. A CMOS logic circuit employing solely enhancement-type transistors and comprising at least a network formed by a first p-channel transistor and a second n-channel transistor functionally connected in electrical series between a high voltage supply VPP, on which a VPP voltage gradually develops in an asymptotic way starting from a minimum value equal to a supply voltage VCC following a transition of the circuit and during a period subsequent thereto, and a ground rail of the circuit, an output node between said series-connected transistors on which producing a high voltage logic signal having a range between zero and VPP and which is a replica of a low voltage logic signal, having a range between zero and VCC, applied to the gates connected in common of said first and second transistors, and characterized by comprising

means for preventing a gated breakdown of said p-channel transistor constituted substantially by a third p-channel transistor, functionally connected between said first p-channel transistor and said intermediate output node, said third p-channel transistor having a gate which is forced to ground potential when said VPP voltage maintains itself equal to said VCC voltage and which is biased at a voltage lower than said VPP voltage by a constant preset value when said VPP voltage rises to an asymptotic maximum value thereof.

4,956,570

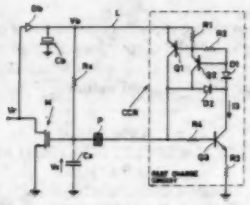
PILOT CIRCUIT WITH INTEGRATED CIRCUIT WITH PRESET FIRING DELAY FOR MOS POWER TRANSISTORS

Alberto Gola, Broni, and Gianluigi Pessina, Lainate, both of Italy, assignors to SGS-Thomson Microelectronics s.r.l., Milan, Italy

Filed Dec. 21, 1988, Ser. No. 287,050
Claims priority, application Italy, Dec. 23, 1987, 23181 A/87
Int. Cl.[5] H03K 17/284, 17/72
U.S. Cl. 307—570 **4 Claims**

1. An integrated pilot circuit with preset firing delay for an MOS power transistor, comprising an R-C network which comprises a condenser inserted between and connected to a gate terminal of the MOS transistor and ground and of a resis-

tance connected in series with said condenser, the pilot circuit further including an SCR circuit provided with threshold



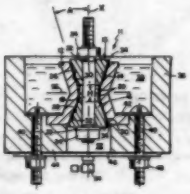
circuit means for allowing firing of said SCR circuit when a charge voltage of said condenser reaches a preset threshold.

4,956,571

SUPERCONDUCTING MAGNETIC BEARING

Keith M. Gordon, Munsonville, and Robert A. Hanson, Peterborough, both of N.H., assignors to MPB Corporation, Keene, N.H.

Filed Mar. 1, 1989, Ser. No. 317,440
Int. Cl.[5] F16C 39/06
U.S. Cl. 310—90.5 5 Claims



1. A superconducting magnetic bearing assembly comprising

an outer element having an axis and, disposed about said axis, said outer element having a first generally conical outer element surface and a second generally conical outer element surface, said first generally conical outer element surface being inverted relative to said second generally conical outer element surface, each said generally conical outer element surface being disposed at an acute angle to said axis, said generally conical outer element surfaces defining a volume,

fixedly disposed within said volume, an inner element rotatable relative to said outer element, said inner element comprising a first conical inner element and a second conical inner element, said first conical inner element having a first inner element surface opposed to and spaced from said first generally conical outer element surface of said outer element, said first inner element surface lying generally parallel to the opposed said first generally conical outer element surface, and said second conical inner element having a second inner element surface opposed to and spaced from said second generally conical outer element surface of said outer element, said second inner element surface lying generally parallel to the opposed said second generally conical outer element surface,

spacer means disposed between said first conical inner element and said second conical inner element for adjusting the axial spacing between the inner element surfaces of said conical inner elements, thereby to adjust the dimension of a space defined between the opposed first surfaces and the opposed second surfaces of said inner element and said outer element,

a predetermined superconductive first element of one of said inner element and said outer element comprising superconductive material and a predetermined magnetic second element of another of said inner element and said outer element comprising a material adapted to generate a magnetic field, and

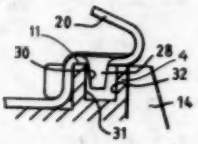
means for forming a magnetic field about said predetermined magnetic second element, said predetermined superconductive first element adapted to expel said magnetic field in a manner to maintain the spaced apart relationship of the opposed first surfaces and the opposed second surfaces of said inner element and said outer element under load.

4,956,572

COMMUTATOR FOR AN ELECTRIC MOTOR

Georg Strobl, Repulse Bay, Hong Kong, assignor to Johnson Electric S.A., La Chaux de Fonds, Switzerland

Filed Apr. 20, 1989, Ser. No. 340,827
Claims priority, application United Kingdom, Apr. 20, 1988, 8809271
Int. Cl.[5] H02K 13/04
U.S. Cl. 310—233 11 Claims



1. An assembled commutator comprising a cylindrical base of electrically insulating material, a plurality of commutator segments mounted on the base, each segment comprising a brush contacting portion which is supported by the base and a generally radially extending tang at one axial end of said brush contacting portion for connection to an armature coil wire, wherein the tang is formed locked to said base by a form locking connection, said form locking connection including an edge on a radially extending arm, said arm being folded about a line generally parallel to the axial direction of the base and behind a radially extending wall formed on the base so that said edge bears against said wall to prevent movement of the segment in a direction from said one axial end of said brush contacting portion towards an opposite end of the contacting portion.

4,956,573

GAS DISCHARGE DISPLAY DEVICE WITH INTEGRAL, CO-PLANAR, BUILT-IN HEATER

Paul H. Smith, La Habra; Lee R. Wood, Downey, and Elias J. Lara, Lake Elsinore, all of Calif., assignors to Babcock Display Products, Inc., Anaheim, Calif.

Filed Dec. 19, 1988, Ser. No. 286,138
Int. Cl.[5] H01J 61/24, 7/24
U.S. Cl. 313—15 10 Claims

1. In a gas discharge display device having a cathode terminal and an anode terminal separated from each other within a sealed gas chamber formed between two layers of glass, the gas in the chamber including a mixture of inert gas and mercury at sub-atmospheric pressure, the improvement comprising:

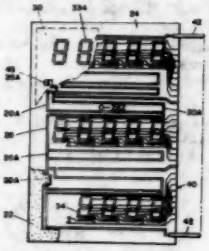
heater means on one of said layers of glass positioned proximate to and co-planar with the cathode terminals within the chamber in said display device for selectively maintaining an appropriate temperature within said display device so that mercury is maintained in a gaseous state within said display device;

said heater means including trim portions thereof which may

be selectively removed in order to alter the characteristics of said heater means;

insulating means intermediate said two layers of glass and including apertures overlying said trim portions of said heater means and said cathode terminals;

said insulating means electrically insulating said heater means from said cathode terminals and from said anode



terminal and operative to facilitate the conduction of heat from said heater means to said gas in said chamber; and

sealing means disposed around the periphery of said display device;

said sealing means arranged to replace the trim portions of said heater means which have been selectively removed in order to prevent electrical interconnection thereof.

4,956,574

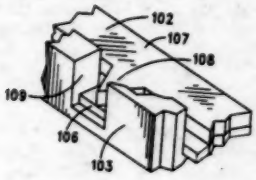
SWITCHED ANODE FIELD EMISSION DEVICE

Robert C. Kane, Woodstock, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 8, 1989, Ser. No. 391,211

Int. Cl.[5] H01J *19/24, 19/32, 19/46*

U.S. Cl. 313—306 **5 Claims**



1. A field emission device, comprising:

(A) an emitter for emitting electrons;

(B) a first anode disposed substantially coplanar with respect to the emitter for collecting at least some of the electrons;

(C) a second anode for selectively collecting at least some of the electrons, such that when the second anode collects electrons, the first anode does not collect electrons.

4,956,575

FLAT PANEL DISPLAY WITH DEFLECTION MODULATION STRUCTURE

Kern K. N. Chang, 91 Adams Dr., Princeton, N.J. 08540

Filed Mar. 23, 1989, Ser. No. 327,614

Int. Cl.[5] H01J *29/70*

U.S. Cl. 313—422 **13 Claims**

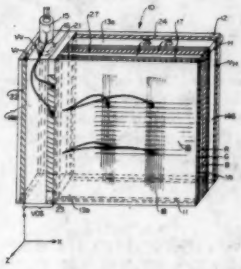
1. A flat panel display, comprising:

an evacuated display envelope having a relatively flat front wall, a rear wall spaced apart in a depthwise direction from the front wall and substantially coextensive therewith, and lateral sides enclosing the space defined between the front and rear walls,

a phosphor screen provided on the inner surface of said front wall substantially in one plane and having a matrix of phosphor elements arranged in horizontal rows and vertical columns disposed over said inner surface of said front wall,

an electron gun on one lateral side of the display envelope for providing an electron beam on a first path into the display envelope along a vertical direction substantially parallel to the plane of the screen,

vertical deflection means for deflecting said beam over the horizontal rows successively in the vertical direction, said vertical deflection means including an initial deflection plate adjacent said first path of said beam from said electron gun to which incremental deflection voltages are applied for deflection said beam along different incremen-



tal trajectories toward said one lateral side of said display envelope, and a vertical reflection plate at said one lateral side of said display envelope which is biased with a voltage for reflecting said beam on said different incremental trajectories toward the respective horizontal rows,

horizontal deflection means for deflecting said beam on said different trajectories to sweep across the phosphor elements of the respective horizontal rows, said horizontal deflection means including a horizontal reflection plate disposed toward the rear wall of said display envelope and having a horizontal sweep voltage applied thereto for deflecting said beam toward said phosphor screen disposed at said front wall of said display envelope, and

color modulation means interposed between said phosphor screen and said beam as deflected by said horizontal deflection means for controlling said beam to impinge upon selected portions of respective phosphor elements to produce the corresponding illumination intensities.

4,956,576

DEVICE FOR COUPLING A FIRST DYNODE OF A PHOTOMULTIPLIER TO A LEAF-TYPE MULTIPLIER

Pierre L'Hermite, Brive, France, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jun. 5, 1989, Ser. No. 361,525

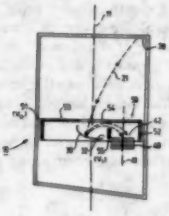
Claims priority, application France, Jun. 10, 1988, 88 07778

Int. Cl.[5] H01J *43/06, 43/02*

U.S. Cl. 313—533 **1 Claim**

1. Photomultiplier tube (10) comprising a photocathode (20), a first cylindrical dynode (30) of generatrices (31) orthogonal to an axis (11) and which is intended to receive the photoelectrons (21) emitted by the photocathode (20), an electron multiplier device (40) of the "leaf" type, and a device (50) for coupling the first dynode (30) to the multiplier device (40), the axis (41) of the multiplier device (40) being parallel to the said axis (11), characterized in that the said coupling device (50) consists, of a first electrode (51) composed of a cylindrical lateral plate (52) of axis parallel to that of the multiplier device, sur-

rounding the first dynode (30) and the entrance (42) of the multiplier device (40), and of an upper plate (53) which is supported, facing the photocathode (20), on the lateral plate (52), and pierced by an opening (54) for passage of the photoelectrons (21) towards the first dynode (30) and, a second plane electrode (55), parallel to the generatrices (31) of the first



dynode and situated between the exit (32) of the first dynode (30) and the entrance (42) of the multiplier device (40), and in that the electrical potential (V_a) of the first electrode (51) is positive in relation to that of the photocathode (20) and substantially equal to that of the first dynode (30), while the electrical potential (V_1) of the second electrode (55) is greater than that (V_a) of the first electrode.

4,956,577

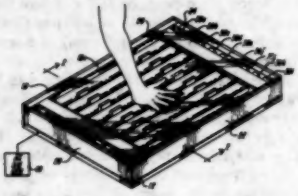
INTERACTIVE LUMINOUS PANEL DISPLAY DEVICE

William P. Parker, Box 909, Waitsfield, Vt. 05673-0909

Continuation-in-part of Ser. No. 192,225, May 10, 1988, Pat. No. 4,887,003. This application Aug. 24, 1988, Ser. No. 235,660

Int. Cl.[5] H01J *17/02, 17/16;* **G09G** *3/02*

U.S. Cl. 313—634 **45 Claims**



1. An interactive luminous display device comprising:

a. an at least partially transparent, non-conductive sheet member having front and back surfaces, said first sheet member having a coupling region on portions of its front surface, said coupling region being adapted to receive thereon an externally applied conductive member;

b. a base member having front and back surfaces, and including an electrically conductive region on at least one of said surfaces;

c. spacer means for mutually positioning said sheet member and said base member whereby the back surface of said sheet member is offset by a predetermined distance from and opposite the front surface of said base member and said conductive region of said base member underlies at least a portion of said coupling region of said sheet member;

d. discharge chamber means for establishing one or more discrete gas impervious chambers between portions of the back surface of said sheet member and the front surface of said base member, said chambers defining closed regions in the gap between said back surface of said sheet member and the front surface of said base member and lying at least partially between said coupling region and said conductive region of said base member; and

e. electroluminescent gas disposed within said closed regions.

4,956,578

SURFACE CONDUCTION ELECTRON-EMITTING DEVICE

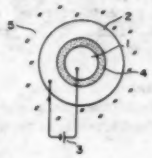
Akira Shimizu, Inagi; Hidetoshi Suzuki, Atsugi; Masahiko Okunuki, Tokyo; Haruhito Ono, Ashigara; Ichiro Nomura, Yamato; Yoshikazu Banno, Atsugi; Toshihiko Takeda, Tokyo, and Tetsuya Kaneko, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,912

Claims priority, application Japan, Jul. 28, 1987, 62-186648; Jun. 10, 1988, 63-141562; Jun. 10, 1988, 63-141563

Int. Cl.[5] H01J *29/96*

U.S. Cl. 315—3 **22 Claims**



1. A surface conduction electron-emitting device comprising a high-potential electrode provided on a substrate surface, an electron-emitting region provided in contact with the entire periphery of an exposed part of said high-potential electrode, and a low-potential electrode further provided in contact with the entire periphery of said electron-emitting region.

4,956,579

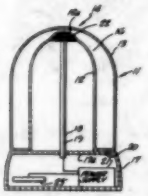
PLASMA DISPLAY USING A DOUBLE-WALLED ENCLOSURE

Larry W. Albright, 419 Sunset Ave., Venice, Calif. 90291

Filed Oct. 14, 1988, Ser. No. 258,200

Int. Cl.[5] H05B *37/00*

U.S. Cl. 315—58 **19 Claims**



1. A gas discharge display device comprising:

a gas containing envelope in the form of a double walled cylinder closed at one end and open at its other end, with the double walls of the cylinder defining an enclosed gas discharge area, said double walls being of a transparent dielectric material, the gas discharge area formed by the double walls being filled with an ionizable gas,

an electrode disposed adjacent to or within the gas discharge area between the cylinder walls at the closed end of the envelope cylinder,

a ground potential reference point outside the double walled cylinder, and

a power supply for coupling an a.c. electrical signal between said electrode and the ground potential reference point for

producing visible electrical discharges in said gas discharge area,

wherein the double walls of the cylinder are spaced between one-fourth of an inch and an inch apart.

4,956,580

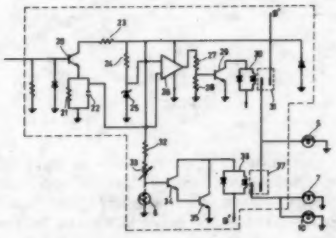
AUTOMATIC CAR LAMPS LIGHTING CONTROLLER

Wang Yun-Shang, No. 4, Lane 34, An Jiu Street, Taipei, Taiwan

Filed Jul. 6, 1988, Ser. No. 215,640

Int. Cl.[5] B60Q *1/26*

U.S. Cl. 315—83 **3 Claims**



1. In a vehicle having a spark ignition engine and a lamp system: the improvement comprising means for automatically energizing lamps in the lamp system in response in operation of the engine and variations in ambient light conditions in the vicinity of the vehicle;

said energizing means comprising an induction coil (3) in close physical proximity to an engine spark plug wire to generate an electrical signal only when the engine is operating;

an amplifier means (20) connected to said induction coil to provide an amplified signal when the engine is operating;

a comparator (26) having two inputs;

means (at 24,25) for supplying a reference voltage to one of the comparator inputs;

circuit means for supplying said amplified signal to the other comparator input, whereby the comparator produces an output trigger signal only when the engine is operating;

a first relay (30) having a first set of contacts (31) for supplying current to the lamp system;

circuit means (at 29) for applying the trigger signal to the first relay for energizing same;

a second relay (36) having a second set of contacts (37) in circuit with said first set of contacts to control current flow to at least some of the lamps in the lamp system;

and a photoresistance means (6) responsive to external ambient light conditions to control current flow through said second relay, whereby lamps in the lamp system are automatically turned on when the engine is operating and the ambient light level is below a predetermined value.

4,956,581

FLYBACK CONVERTER MICROWAVE OVEN POWER SUPPLY

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Continuation of Ser. No. 808,286, Dec. 12, 1985, abandoned. This application Jun. 12, 1989, Ser. No. 366,269

Int. Cl.[5] H05B *39/00, 41/14, 6/64;* H02M *3/335*

U.S. Cl. 315—101 **7 Claims**

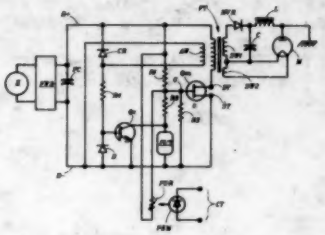
1. An arrangement comprising:

a source of DC voltage;

a magnetron having a high-voltage DC input;

power supply means connected with the source and operable to provide unidirectional current pulses to a high-voltage DC output; and

filter means connected between the high-voltage DC output and the high-voltage DC input, thereby to provide to this



high-voltage DC input a unidirectional current of substantially constant magnitude.

4,956,582

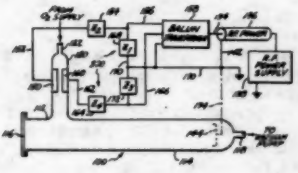
LOW TEMPERATURE PLASMA GENERATOR WITH MINIMAL RF EMISSIONS

Roger J. Bourassa, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 19, 1988, Ser. No. 183,648

Int. Cl.[5] H01J *7/24, 17/26;* H05B *31/26;* H01Q *3/10*

U.S. Cl. 315—111.21 **19 Claims**



1. A low temperature plasma generator having reduced radio frequency noise emissions, comprising:

(a) a chamber formed of a material that is substantially electrically nonconductive, said chamber including a vacuum port adapted for connection to a vacuum pump and an inlet port adapted for connection to a source of a gas;

(b) a first and a second electrode disposed in proximity to the chamber, spaced apart, but generally adjacent each other;

(c) a radio frequency power source;

(d) a transformer having primary terminals connected to the radio frequency power source, and secondary terminals isolated from ground potential upon which potentials are developed having opposite polarity in respect to each and varying about ground potential; and

(e) balanced impedance matching means electrically connecting the secondary terminals of the transformer to the first and second electrodes, for matching an output impedance of the secondary terminals to an input impedance of the first and the second electrodes.

4,956,583

CONTROL SYSTEM FOR ELECTRICAL LIGHTING

John A. Lawrence, and David A. Finch, both of Nutley, England, assignors to Econolight Limited, London, England

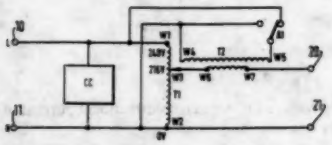
PCT No. PCT/GB87/00756, § 371 Date Jul. 11, 1988, § 102(e) Date Jul. 11, 1988, PCT Pub. No. WO88/03353, PCT Pub. Date May 5, 1988

PCT Filed Oct. 26, 1987, Ser. No. 207,158

Claims priority, application United Kingdom, Oct. 27, 1986, 8625690; Oct. 27, 1986, 8625691

Int. Cl.[5] H05B 37/00

U.S. Cl. 315—220 13 Claims



1. A control system for lighting rated to operate at a normal mains supply voltage comprising:

first transformer means for providing a reduced voltage below normal mains voltage for the lighting to provide reduced power during operation thereof;

second transformer means for providing a supplementary voltage when initially operating the lighting to increment the reduced voltage to a value approximating said normal mains voltage; and

means for thereafter removing the supplementary voltage;

said second transformer means including means defining primary and secondary windings, the primary and secondary windings being arranged so as to induce said supplementary voltage in the secondary winding when said primary winding is energized, and the control system being so arranged that the secondary winding present negligible impedance to current flow from the first transformer means to the lighting when not producing said supplementary voltage.

4,956,584

STROBE TRIGGER PULSE GENERATOR

Scott T. Sikora, Mesa, Ariz., assignor to Tomar Electronics, Inc., Gilbert, Ariz.

Continuation-in-part of Ser. No. 238,039, Aug. 29, 1988, which is a continuation of Ser. No. 42,357, Apr. 24, 1987, Pat. No. 4,775,821, which is a continuation-in-part of Ser. No. 794,415, Nov. 4, 1984, Pat. No. 4,682,081. This application Oct. 31, 1988, Ser. No. 265,414

Int. Cl.[5] H05B 37/00, 39/00; H02M 3/335, 7/537

U.S. Cl. 315—241 R 39 Claims

1. Apparatus for delivering current to an intermittently energized gaseous discharge tube comprising:

a. a power supply for receiving an input voltage and for generating an output voltage;

b. an energy storage capacitor coupled to be charged to a predetermined voltage by the power supply;

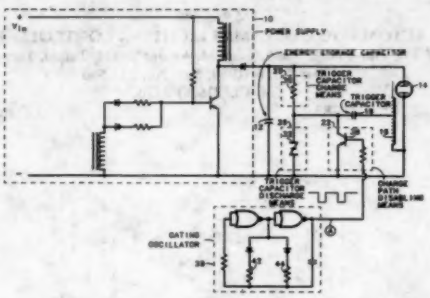
c. a trigger pulse generator for intermittently energizing a trigger pulse transformer including

i. a trigger capacitor having first and second leads, the first lead being coupled to the trigger pulse transformer;

ii. trigger capacitor charging means having an input terminal coupled to receive the power supply output voltage and an output terminal coupled to the second lead of the trigger capacitor for establishing a current flow path between the power supply and the trigger capacitor to direct a charging current to the trigger capacitor;

iii. trigger capacitor discharge means coupled to the second lead of the trigger capacitor for periodically discharging the trigger capacitor through the trigger pulse transformer to generate a high voltage trigger pulse; and

iv. charge path disabling means continuously coupled to the current flow path between the power supply and the



trigger capacitor to actively control the charging current directed to the trigger capacitor without removing the input voltage from the power supply to control the generation of trigger pulses independent of the energy storage capacitor voltage.

4,956,585

LINE DEFLECTION CIRCUIT FOR A PICTURE TUBE

Gérard Rilly, Unterkirchnach, France, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

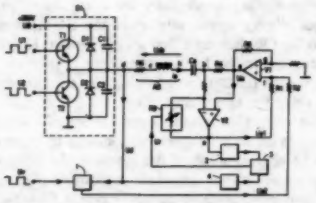
PCT No. PCT/EP88/00259, § 371 Date Oct. 27, 1989, § 102(e) Date Oct. 27, 1989, PCT Pub. No. WO88/07799, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 29, 1988, Ser. No. 411,486

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3711173

Int. Cl.[5] H01J 29/56, 29/70, 29/72

U.S. Cl. 315—371 9 Claims



1. A line deflection circuit for a picture tube, for generating a deflection current in a deflection coil and a tangential capacitor, said deflection circuit comprising:

an active switch for supplying a near square wave shaped output voltage to one end of said deflection coil, at half line frequency and at a keying ratio of 1:1; and,

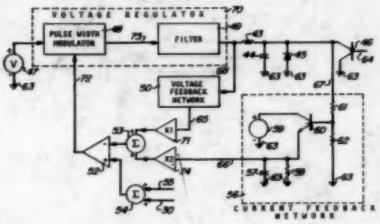
an amplifier having an output coupled to the other end of said deflection coil and having a control input responsive to at least one of first and second corrective variables to assure linearity of a deflection current flowing through said deflection coil and line centered zero crossing of said deflection current, said first corrective variable being representative of said deflection current through said deflection coil and said second corrective variable being related to a deviation of said output voltage from said square wave shape.

4,956,586

FREQUENCY INDEPENDENT CRT HORIZONTAL SWEEP GENERATOR HAVING CURRENT FEEDBACK AND IMPROVED PINCUSHION CORRECTION CIRCUITRY

Kirk P. Gipson, Roseville, and Ronald M. Guly, Davis, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 3, 1989, Ser. No. 318,285
Int. Cl.[5] H01J 29/70
U.S. Cl. 315—387 13 Claims



1. A signal generator for generating a yoke signal for application to a horizontal yoke of a cathode ray tube, the signal generator having as a first input a first dc signal at a width voltage which determines the width of horizontal scan lines of the cathode ray tube and having a second input a pincushion correction signal having a pincushion correction signal voltage, the signal generator comprising:

a voltage source;

yoke current generator means, coupled to the horizontal yoke for generating a yoke current, the yoke current passing through the horizontal yoke, the yoke current having a peak value;

current feedback network, coupled to the yoke generator means, the current feedback network generating a first feedback signal with a first feedback signal voltage proportional to the peak value of the yoke current;

voltage feedback network, coupled to the horizontal yoke, for generating a second feedback signal with a second feedback signal voltage proportional to a yoke voltage applied to the horizontal yoke;

first summing means, coupled to the first input and to the second input, for producing a first summing signal having a first summing signal voltage which is the sum of the width and the pincushion correction signal voltage;

second summing means, coupled to the current feedback network and to the voltage feedback network, for producing a second summing signal which has a second summing signal voltage which is the sum of the first feedback signal voltage and the second feedback signal voltage;

amplification means, coupled to the first summing means and to the second summing means for producing a third feedback signal having a third feedback signal voltage, the third feedback signal voltage being dependent on the difference of the first summing signal voltage and the second summing signal voltage; and,

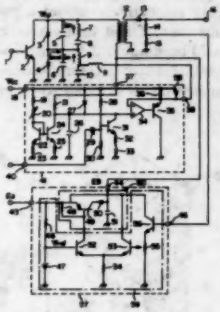
voltage regulator means, coupled to the voltage source, the horizontal yoke, the voltage feedback network and the amplification means, for regulating the yoke voltage based on the third feedback signal voltage.

4,956,587

HORIZONTAL DEFLECTION-HIGH VOLTAGE CIRCUIT

Kouji Kitou, and Makoto Onozawa, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 204,283, Jun. 9, 1988. This application Jan. 26, 1989, Ser. No. 301,531
Claims priority, application Japan, Jan. 29, 1988, 63-17006
Int. Cl.[5] H01J 29/70, 29/76
U.S. Cl. 315—408 14 Claims



1. Horizontal deflection signal and high voltage signal generator for driving a cathode ray tube comprising:

a horizontal output transistor;

a damper diode connected to said horizontal output transistor in parallel;

a resonance means having a first resonance circuit and a second resonance circuit connected in parallel to said damper diode, wherein said first resonance circuit has a horizontal deflection coil connected to a first capacitor in series and said second resonance circuit has a modulating coil connected to a second capacitor in series;

a flyback transformer wherein one end of a first winding of said flyback transformer is connected to said first resonance circuit;

a voltage regulating means connected betWeen the other end of said first winding of said flyback transformer and a voltage supply terminal, which controls voltage supplied to said first winding of said flyback transformer for keeping output voltage on a second winding of said flyback transformer constant; and

a horizontal deflection current control means which detects deviation of said voltage supplied to said first capacitor and controls a voltage supplied to said second capacitor according to said detected deviation.

4,956,588

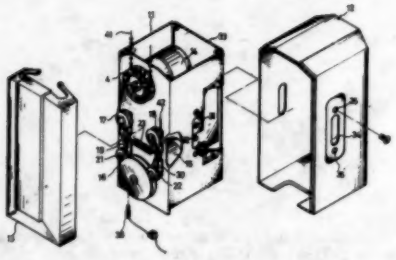
ATTACHABLE HAND-OPERATED/AUTOMATIC DUAL USAGE VENETIAN BLIND CONTROLLER

Nien Ming, Room C. 4th Fl., No. 99, Jen-Ai Rd., Sec. 4, Taipei, Taiwan

Filed Dec. 21, 1989, Ser. No. 454,463
Int. Cl.[5] H04Q 9/02
U.S. Cl. 318—16 4 Claims

1. An attachable hand-operated/automatic dual usage venetian blind controller, including two DC motor and speed reducing gear set assemblies, a housing, an inner casing, an outer cover, a beading cord driving wheel, a pull cord driving wheel, two guide wheels, two pressure wheels, a spring, an infrared transmitter, and an infrared receiver control circuit, said inner casing being received in said housing covered with said outer cover and having two holes for positioning therein said two DC motor and speed reducing gear set assemblies respectively, said infrared receiver control circuit being

mounted on said inner casing at its back side, said beading cord driving wheel being mounted on a shaft on one of said two DC motor and speed reducing gear set assemblies and having a circular channel for mounting thereon a beading cord of a venetian blind, and a plurality of round holes bilaterally disposed on the two circular side walls defined by its circular channel, said pull cord driving wheel being made of resilient rubber material for mounting thereon of a pull cord of same venetian blind and fixedly attached to the other one of said two DC motor and speed reducing gear set assemblies, said two guide wheels being respectively mounted on two elongated plates at one ends thereof and firmly secured to said inner casing between said beading cord driving wheel and said pull cord driving wheel, said two pressure wheels being mounted on said two elongated plates at the opposite ends thereof, said



spring being connected between said two elongated plates to constantly pull said two pressure wheels inward to press on any cord mounted on the circular channel of said pull cord driving wheel, said infrared receiver control circuit being comprised of an infrared receiver, a microprogram control unit, two driving circuits and two motor overload detecting circuits,

wherein said infrared receiver control circuit drives either one of said two DC motor and speed reducing gear set assemblies to carry said beading cord driving wheel or said pull cord driving wheel to rotate, according to the signal received from said infrared transmitter, to further pull out or draw up the blades of the connected venetian blind or turn the blades of such a venetian blind to change their angular position.

4,956,589

INTEGRATED TOOL CONTROL FOR WORK STATION

Victor M. Cherlo, 127 Archer Ave., Mount Vernon, N.Y. 10550

Filed Dec. 12, 1988, Ser. No. 283,121

Int. Cl.[5] H02P *7/36*

U.S. Cl. 318—67 **11 Claims**

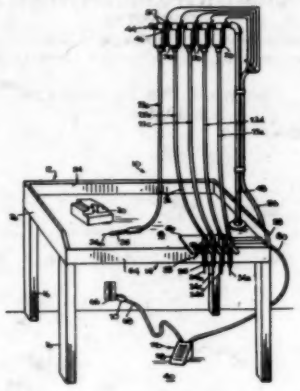
1. An integrated control system for a work station comprising:

a speed control means;

a plurality of power means for driving respective tools at the work station;

means at the work station for selectively switching individual ones of the power means to the speed control means, and wherein each of said power means is provided with an output flexible drive member; and

said switching means includes selector means responsive to the presence of respective ones of said flexible drive members, said switching means being activated to apply power via said speed control means to the selected power means



for which the flexible drive member is removed from the switching means.

4,956,590

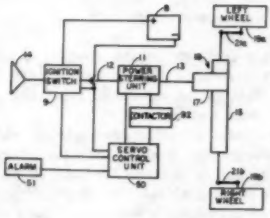
VEHICULAR POWER STEERING SYSTEM

Edward H. Phillips, Middletown, Calif., assignor to Techco Corporation, New York, N.Y.

Filed Oct. 6, 1988, Ser. No. 254,968

Int. Cl.[5] G05B *11/10;* **B62D** *5/04*

U.S. Cl. 318—432 **1 Claim**



1. A steering assembly for multiplying steering torque and motion applied to a steering wheel of a vehicle by fixed and selectively varying ratios, respectively, said assembly comprising:

input shaft means for coupling steering torque and motion applied to the steering wheel to a sun gear of a planetary gear set,

torque generating means

means for coupling the torque generating means to a ring gear of the planetary gear set,

means for determining rotational motion of the input shaft means,

means for controlling rotational motion of the torque generating means in a rotational motion which is a selected function of the rotational motion of the input shaft,

means for determining actual rotational motion of the torque generating means,

means for terminating rotational motion of the torque generating means if the actual rotational motion of the torque generating means does not substantially match the selected rotational motion,

planetary gear and carrier means for receiving output torque and rotational motion from both the sun and ring gears,

output shaft means for delivering the output torque and rotational position to a steering gear,

whereby steerage of said vehicle is maintained when failure of said torque generating means occurs.

4,956,591

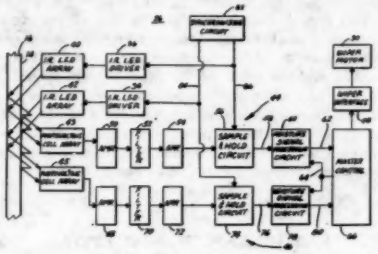
CONTROL FOR A MOISTURE SENSOR

Kenneth L. Schierbeek, Zeeland; Mark L. Larson, Grand Haven, and Kenneth Schofield, Holland, all of Mich., assignors to Donnelly Corporation, Holland, Mich.

Continuation-in-part of Ser. No. 317,288, Feb. 28, 1989. This application Jul. 10, 1989, Ser. No. 377,589

Int. Cl.[5] B60S *1/08*

U.S. Cl. 318—483 **35 Claims**



12. A moisture sensing control for use with a window to detect and indicate the presence of moisture on a surface of said window, said control comprising:

emitter means for intermittently emitting a signal in a manner that said signal is modified in response to moisture on said window;

circuit means for periodically actuating said emitter means to emit said signal for a predetermined duration of time;

detecting means for detecting and processing said signal to produce a moisture signal that is a function of said signal; and

inhibiting means responsive to said circuit means for inhibiting said detecting means from detecting and processing said signal except during said duration when said emitter means is actuated by said circuit means to emit said signal.

4,956,592

AUTOMATICALLY POSITIONABLE CHAIR

Stephen R. Schulte; Stephen C. Wissel, both of Cincinnati, and John B. Wilker, Sr., Fairfield, all of Ohio, assignors to Midmark Corporation, Versailles, Ohio

Filed Mar. 31, 1989, Ser. No. 331,931

Int. Cl.[5] G05B *11/01*; A47C *1/02*

U.S. Cl. 318—560 **15 Claims**

1. In a positionable chair comprising a moveable support surface, an electric motor for moving said support surface to a continuously variable series of work positions, a power supply for said electric motor and switch means for selectively connecting said motor to said power supply and causing said support surface to move to said work positions; improved positioning control apparatus comprising:

timing means for indicating the time consumed during movement of said support surface,

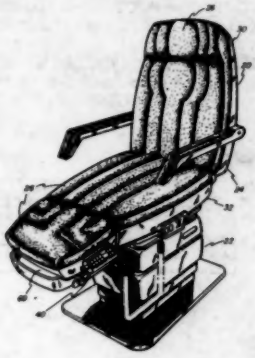
sensing means for sensing the current drawn by said motor during said movement,

computing means responsive to said timing means and to said sensing means for computing a position parameter related to the position of said support surface, and

control means responsive to a target value of said position parameter for stopping said motor.

14. Method of positioning a chair surface by an electric motor comprising the steps of:

measuring the current drawn by said motor,



using the measured value of said current to determine the speed of said motor,

integrating said speed over time to obtain a position parameter, and

stopping said motor when said position parameter has reached a predetermined target value.

4,956,593

SERVO MOTOR CONTROLLING METHOD

Keiji Sakamoto, Hachioji; Shinji Seki, Kokubunji, and Yasusuke Iwashita, Minamitsuru, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

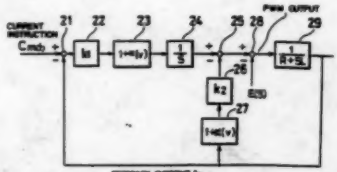
PCT No. PCT/JP88/00978, § 371 Date May 24, 1989, § 102(e) Date May 24, 1989, PCT Pub. No. WO89/03611, PCT Pub. Date Apr. 20, 1989

PCT Filed Sep. 22, 1988, Ser. No. 368,291

Claims priority, application Japan, Oct. 14, 1987, 62-259333

Int. Cl.[5] G05B *13/00*

U.S. Cl. 318—561 **5 Claims**



1. A servo motor controlling method for controlling both speed and current of a servomotor under digital control, and having a current controlling loop in a speed loop, comprising the steps of:

(a) sensing the speed of the servo motor; and

(b) controlling an integration gain and a loop proportional gain of the current controlling loop, the integration gain and the proportional gain being changed depending upon the speed of the servo motor.

4,956,594
METHOD OF CONTROLLING A ROBOT IN ACCORDANCE WITH LOAD CONDITIONS

Toru Mizuno, Tama; Haruyuki Ishikawa, Shinjuku, and Takashi Iwamoto, Oshino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

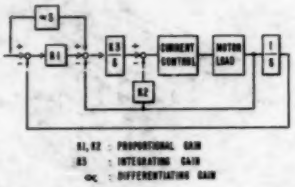
PCT No. PCT/JP88/00948, § 371 Date Mar. 23, 1989, § 102(e) Date Mar. 23, 1989, PCT Pub. No. WO89/02624, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 17, 1988, Ser. No. 332,934

Claims priority, application Japan, Sep. 19, 1987, 62-233638

Int. Cl.[5] G05B *19/42*

U.S. Cl. 318—568.1 **10 Claims**



1. A method of controlling a robot in accordance with load conditions, comprising the steps of:

(a) storing beforehand load conditions for various operations of the robot;

(b) reading a program including operation commands, for instructing a series of operations to be executed by the robot, and load condition commands, each representing a load condition for a corresponding operation in the series of operations;

(c) reading one of the load conditions stored in step (a) corresponding to a load condition command individually read from the program in step (b), and determining a desired control condition based on the load condition read; and

(d) controlling the robot in accordance with the desired control condition determined in step (c).

4,956,595
DRIVING CIRCUIT FOR A FIVE-PHASE STEPPING MOTOR

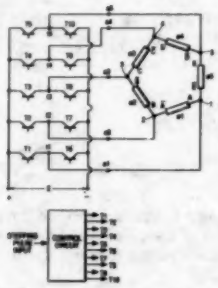
Satomi Hirofumi, and Domeki Hideo, both of Kashiwa, Japan, assignors to Oriental Motors Corp., Ltd., Tokyo, Japan

Filed May 9, 1988, Ser. No. 191,416

Claims priority, application Japan, Oct. 16, 1987, 62-261315

Int. Cl.[5] H02P *8/00*

U.S. Cl. 318—696 **6 Claims**



1. For a five-phase stepping motor energizable by a power source having a positive pole and a negative pole, with the motor including five phase-windings each having a starting end and a terminating end in which each of the starting ends of one phase-winding is successively connected at a junction to each of the terminating ends of another phase winding to form a ring,

a driving circuit, comprising:

a plurality of pairs of switching means connected in series to each other, each of said pairs including a connection therebetween,

said connections each being connected to one of the junctions between the phase-windings,

one of each pair of the switching means being connected to the positive pole of the power source and the other of each pair of the switching means being connected to the negative pole of the power source so that the switching means can be turned on and off to connect the junctions to a pole of the power source,

pulsing means responsive to input pulses for actuating said switching means and turning the switching means on and off in one of two sequences, the first of the sequences being such that at each pulse the switching means connect a total number of four junctions to the poles of the power source and the other of the other of said sequences includes two alternately repeated states in one state of which the switching means connect a total number of three junctions to the poles of the power source and in another state of which the switching means connect a total number of four junctions to the poles of the power source.

4,956,596
VARIABLE SPEED DRIVE SYSTEM

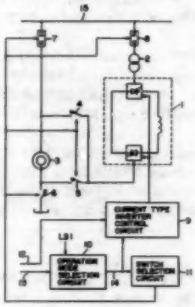
Yoshihiro Ogashi, Funabashi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1989, Ser. No. 422,551

Claims priority, application Japan, Oct. 17, 1988, 63-259381

Int. Cl.[5] H02P *7/62*

U.S. Cl. 318—801 **5 Claims**



1. An a.c. variable speed drive system comprising:

a forced commutation type inverter for controlling a wound-rotor type induction motor at variable speed;

an operation mode selection circuit for selectively outputting either a driving operation signal or a regenerative operation signal for said forced commutation type inverter by comparing an operation speed feedback signal from said wound-rotor type induction motor with a predetermined judgement value;

a forced commutation type inverter control circuit for causing said forced commutation type inverter to operate in a driving operation mode or a regenerative operation mode in accordance with an output from said operation mode selection circuit;

a connection circuit for supplying an output from a converter of said forced commutation type inverter to said wound-rotor type induction motor via a path suitable for

said driving operation mode or said regenerative operation mode; and

a switch circuit for switching a path of said connection circuit in accordance with the output of said operation mode selection circuit.

4,956,597

METHOD AND APPARATUS FOR CHARGING BATTERIES

Frederick D. Heavey, St. Paul, and Rudolph Engleman, Minneapolis, both of Minn., assignors to American Monarch Corporation, Minneapolis, Minn.

Continuation of Ser. No. 10,828, Feb. 4, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,102

Int. Cl.[5] H02J *7/00*; H01M *10/44*

U.S. Cl. 320—14 **31 Claims**

1. Apparatus for charging a battery of the type that enters into a gassing phase when full charge is approached, comprising:

(a) means for applying charging current to charging terminals of the battery;

(b) means operatively connected with said battery charging terminals for periodically operatively connecting a load across said battery terminals;

(c) means operatively connected to said load for sensing the electrical response of said load when energized by said battery and for providing a sensed load signal in response thereto;

(d) means operatively connected to receive said sensed load signal for isolating therefrom that portion of said sensed load signal attributable only to energization of said load by said battery;

(e) means operatively connected to receive said isolated sensed load signal for determining therefrom when said battery enters its gassing phase and for producing a gassing phase signal indicative of the gassing phase condition of said battery; and

(f) means operatively connected with said battery and to receive said gassing phase signal for applying a predetermined overcharge to said battery after said battery has entered into its gassing phase.

4,956,598

LOW DISTORTION CONTROL FOR A VSCF GENERATING SYSTEM

Bradley J. Recker; Thong-Meng Cheng; Derrick I. Roe, all of Rockford, Ill., and Christopher J. Rozman, Delavan, Wis., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 16, 1988, Ser. No. 285,423

Int. Cl.[5] H02P *9/42*; H02M *5/32*; H02J *3/00*

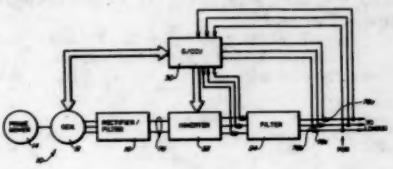
U.S. Cl. 322—28 **16 Claims**

1. A control for a variable speed, constant frequency (VSCF) system having a generator including an exciter and which develops generator AC output power, a rectifier for rectifying the generator AC output power to produce DC power on a DC link and an inverter coupled to the DC link which is controlled to produce AC power at a desired frequency at an inverter output, comprising:

means for sensing a parameter of the AC power;

means for sensing a parameter of the DC power;

means responsive to the parameter of the AC power for developing a control signal for controlling the inverter to maintain the parameter of the AC power at a desired level; and



means responsive to the developing means and to the parameter of the DC power for controlling the generator exciter to maintain the parameter of the DC power at a particular level relative to the parameter of the AC power.

4,956,599

POWER CONTROL APPARATUS

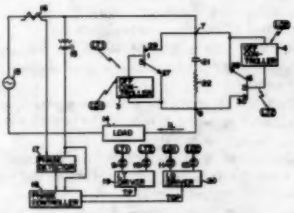
Jun-ichi Nishizawa; Takashige Tamamushi, both of Sendai; Koji Ishibashi, and Kiyoshi Wagatsuma, both of Tagajo, all of Japan, assignors to Tohoku Electric Manufacturing Co., Ltd., Tagajo and Zaidan Hojin Handotai Kenkyu Sinkokai, Sendai, both of, Japan

Filed Jan. 19, 1989, Ser. No. 298,900

Claims priority, application Japan, Jan. 22, 1988, 63-12096

Int. Cl.[5] G05F *1/455*

U.S. Cl. 323—244 **4 Claims**



1. A power control apparatus comprising:

static induction thyristor AC switch means including at least a pair of static induction thyristors coupled in parallel in mutually opposite bias directions between an AC power source and a load;

ON control means for turning on said static induction thyristor AC switch means, said ON control means including,

a first phase control section for outputting a turn-on timing pulse within an ignition phase angle of 180° overlapping a zero-cross point of an AC voltage output from said AC power source, and

a light trigger driver section for irradiating a light ON signal directly on said pair of static induction thyristors in response to said timing pulse; and

OFF control means for turning off said static induction thyristor AC switch means, said OFF control means including,

a phase detecting section for detecting a phase difference between said AC voltage and an AC current output from said AC power source,

a second phase control section for providing a phase-controlled turn-off timing pulse within a given period of said AC current using phase difference data attained from said phase detecting section and said AC voltage, and

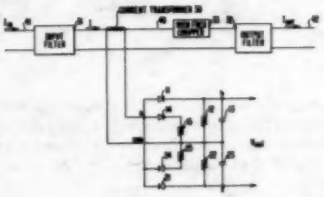
a light quench driver section for supplying an OFF control signal to said static induction thyristor AC switch means in response to said turn-off timing pulse.

4,956,600

HIGH FREQUENCY CURRENT DETECTOR FOR A LOW FREQUENCY LINE

Alex J. Severinsky, Silver Spring, Md., assignor to Viteq Corporation, Lanham, Md.

Filed Jul. 1, 1988, Ser. No. 214,266
Int. Cl.[5] G01R *31/02*; G01N *29/04*
U.S. Cl. 324—103 R **13 Claims**



13. A line isolated current detector for detecting low frequency peak to peak currents on a high frequency chopped line comprising:

a high frequency current transformer for sensing both low frequency and high frequency currents in a high frequency line;

a first positive wave detector with an input connected to a first output of the current transformer;

a first load connected between an output of the first positive wave detector and a second output of the current transformer;

a first negative wave detector with an input connected to a first output of the current transformer;

a second load connected between an output of the first negative wave detector and a second output of the current transformer;

a positive wave memory for storing a positive wave detected by the positive wave detector, the positive wave memory connected across the first load;

a negative wave memory for storing a negative wave detected by the negative wave detector, the negative wave memory connected across the second load;

an output connected across outputs of the first positive wave detector and the second positive wave detector so that the values stored in the positive and negative wave memories will add to allow a peak to peak measurement;

a second positive wave detector with an input connected to a first output of the current transformer;

a third load connected between an output of the second positive wave detector and a second output of the current transformer;

a fourth negative wave detector with an input connected to a first output of the current transformer; and

a fifth load connected between an output of the second negative wave detector and a second output of the current transformer.

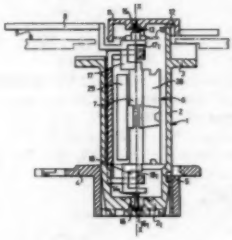
4,956,601

APPARATUS FOR MEASURING AN ELECTRICAL QUANTITY WITH AN ADJUSTABLE ZERO POSITION AND DOUBLE PIVOT ARRANGEMENT

Jacques Palencher, Troyes, and Gabriel Jaillant, Creney Pont Sainte Marie, both of France, assignors to Radio Controle S.A., Lyons, France

Filed Jun. 5, 1989, Ser. No. 361,934
Claims priority, application France, Jun. 6, 1988, 88 07488; May 3, 1989, 89 05899
Int. Cl.[5] G01R *1/02*
U.S. Cl. 324—154 PB **8 Claims**

1. Apparatus for measuring an electrical quantity, comprising a fixed body and a movable device having a pivot shaft fixed to an indicator needle which moves in front of a graduated scale, and pivoting means for pivotally mounting said movable device to said fixed body, said pivoting means including pivot pins provided on two opposing ends of said shaft and first bearings provided on said fixed body for receiving said



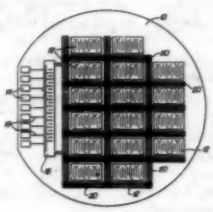
pivot pins, and knives having knife edges and fixed to said shaft adjacent said ends thereof and second bearings fixed to said body for receiving said knife edges, said knife edges and said pivot pins together with said first and second bearings being aligned with each other.

4,956,602

WAFER SCALE TESTING OF REDUNDANT INTEGRATED CIRCUIT DIES

William J. Parrish, Santa Barbara, Calif., assignor to Amber Engineering, Inc., Goleta, Calif.

Filed Feb. 14, 1989, Ser. No. 310,841
Int. Cl.[5] G01R *31/28*; G06F *11/26*
U.S. Cl. 324—158 R **8 Claims**



1. A redundant die wafer test system, comprising:

a semiconductor substrate having an upper major surface;

a plurality of integrated circuit dies formed on said substrate in separate regions of said upper major surface, said separate regions being separated by a plurality of dicing lanes, each of said integrated circuit dies having a plurality of electrical bonding pads;

a plurality of wafer test pads formed on said substrate;

interchip multiplexor means, coupled to said plurality of electrical bonding pads and said plurality of wafer test pads, for providing electrical test signals from said wafer test pads to said plurality of integrated circuit dies and providing output test signals from said dies to said wafer test pads said interchip multiplexor means including a plurality of interchip multiplexor lines formed on said upper major surface of said semiconductor substrate and a plurality of electrical leads coupling said electrical bonding pads to said interchip multiplexor lines, said electrical leads traversing said dicing lanes on said upper major surface of said semiconductor substrate; and

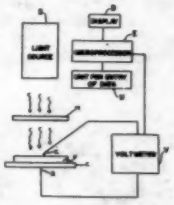
circuit protection means for disconnecting said electrical bonding pads from said multiplexor lines after dicing along said dicing lanes.

4,956,603

METHOD AND APPARATUS FOR MEASURING THE LIFETIME ON P-N SEMICONDUCTOR JUNCTIONS BY PHOTOVOLTAIC EFFECT

Vincenzo Russo, Acireale, Italy, assignor to SGS-Thomson Microelectronics S.r.l., Italy

Filed Mar. 29, 1989, Ser. No. 330,165
Claims priority, application Italy, Mar. 29, 1988, 20006 A/88
Int. Cl.[5] G01R *31/26*
U.S. Cl. 324—158 D 7 Claims



6. A method for measuring the lifetime of P-N semiconductor junctions by means of the photovoltaic effect which comprises:

subjecting a side of semiconductor junction to a monochromatic beam of light;

measuring the photovoltage generated at the terminals of said junction as a result of the beam striking a side of the semiconductor junction; and

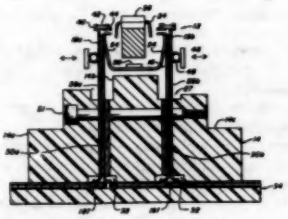
calculating the lifetime of said junction by means of a function τ (Vp) which takes into account the relationship between (1) the lifetime of the semiconductor conductor junction and (2) the generated photovoltage as well as the measurement conditions and the structural parameters of the junction.

4,956,604

BROAD BAND CONTACTOR ASSEMBLY FOR TESTING INTEGRATED CIRCUIT DEVICES

Nicholas J. Cedrone, Wellesley Hills, Mass., assignor to Daymarc Corporation, Waltham, Mass.

Continuation of Ser. No. 88,894, Aug. 24, 1987, abandoned, which is a continuation of Ser. No. 660,475, Oct. 12, 1984, Pat. No. 4,689,556. This application Feb. 17, 1989, Ser. No. 312,437
Int. Cl.[5] G01R *31/28;* H01P *5/00*
U.S. Cl. 324—158 F 6 Claims



1. In a contactor assembly for the high speed, automatic testing of first electronic devices (DUT's) that are packaged with a line of pins arrayed along at least one side of each of the DUT's where the contactor assembly includes a base formed of an insulating material and a plurality of elongated contacts mounted in said base and arrayed in at least one row with a first end of each contact positioned to make electrical connection with an associated pin of the DUT, said contacts being formed of a conductive material and being resiliently flexible to deform laterally from a first position where the first ends of the contact are spaced from the associated one of said pins to allow an unrestricted movement of the DUT through the contactor to and from a testing position to a second position where the first ends of the contacts make electrical connection with the associated pins when the DUT is in the testing position, the improvement comprising

at least one second electronic device in electrical connection with the DUT through one or more selected pins where said second electronic device is in close physical proximity to the DUT during testing and disposed between the DUT and said base, the spacing between said DUT and said second device being substantially less than the length of said contacts, and

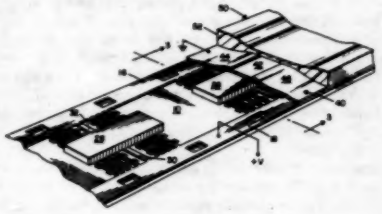
resilient mounting means for said second electronic device which can accommodate the movement of said contacts between said first and second positions comprising at least two arms formed of a conductive material, each arm having a first portion secured to and in continuous electrical connection with selected one of said contacts near its first end so that it is in electrical connection with said contact when it is in both said first and said second positions, said first ends of said mounting means being movable with the associated contact between said first and said second positions and a second portion secured to and in continuous electrical connection with said second electronic device.

4,956,605

TAB MOUNTED CHIP BURN-IN APPARATUS

Harry R. Bickford, Ossining, N.Y.; William L. Boland, Austin, Tex.; Daniel P. Morris, Purchase, N.Y., and Timothy C. Reiley, Los Gatos, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 18, 1989, Ser. No. 381,623
Int. Cl.[5] G01R *31/02;* H01L *23/06*
U.S. Cl. 324—158 F 9 Claims



1. A structure comprising:

a carrier tape having an elongated dimension and a plurality of sets of beam leads thereon;

at least one electronic device supported on said tape and electrically connected to at least one set of said beam leads, at least a first said beam lead connected to a common potential connection on said device and at least a second said beam lead connected to a power terminal on said device;

a common potential bus which runs along said elongated dimension of said tape and is connected to said first beam lead;

a power bus which runs along said elongated dimension and is connected to said second beam lead; and

an interposer tape disposed in contact with said carrier tape, said interposer tape having a common potential portion and power portion, said interposer tape aligned with said carrier tape so that its common potential portion and power portion are aligned and in contact respectively with the common potential bus and power bus on said

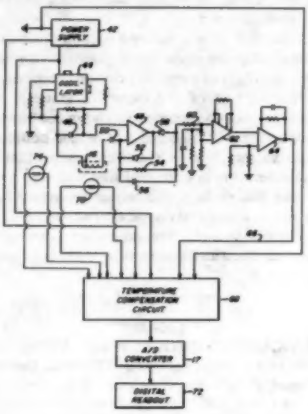
carrier tape, whereby said interposer tape portions provide parallel conductive pathways for said buses.

4,956,606

NON-CONTACT INDUCTIVE DISTANCE MEASURING SYSTEM WITH TEMPERATURE COMPENSATION

Richard F. Kwiatkowski, Wexford; Bruce C. Gallagher, Callery, and Jack L. Bicehouse, Renfrew, all of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Oct. 17, 1984, Ser. No. 661,726
Int. Cl.[5] G01R *33/025*
U.S. Cl. 324—207.12 **7 Claims**



1. Apparatus for measuring the distance between a detecting coil and a metallic object comprising:

an oscillator,

an amplifier having an input,

an L-C circuit including a detecting coil and a capacitor in series connecting the output of said oscillator to the input of said amplifier whereby the amplitude of the signal appearing at the output of said amplifier will vary as a function of the distance between said detecting coil and an adjacent metallic object, the frequency of said oscillator being offset with respect to the resonant frequency of said L-C circuit whereby the output of said amplifier is essentially linear,

temperature-compensating means connected to the output of said amplifier for altering said output to correct for fluctuations in power supply voltages and electronic component operating characteristics due to temperature variations thereby producing a temperature-compensated signal; and

means for indicating the amplitude of said temperature-compensated signal, and, hence the distance between said detecting coil and an adjacent metallic object.

4,956,607

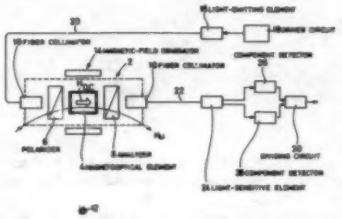
METHOD AND APPARATUS FOR OPTICALLY MEASURING ELECTRIC CURRENT AND/OR MAGNETIC FIELD

Masanori Abe, Tokyo; Syunzo Mase, Tobishima, and Yoshinari Kozuka, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Feb. 23, 1989, Ser. No. 314,108
Claims priority, application Japan, Mar. 3, 1988, 63-50117
Int. Cl.[5] G01R *33/032, 19/00*
U.S. Cl. 324—244 **11 Claims**

1. A method of optically measuring the strength of an AC magnetic field, by a measuring apparatus which includes a magnetooptical sensing head having at least a magnetooptical element, a polarizer and an analyzer, a light source device for producing a light beam to which the sensing head is exposed, and light-sensitive means for converting an optical output of the sensing head into an electric signal, said light beam being modulated into said optical output by the sensing head, according to the strength of said AC magnetic field to which said magnetooptical element is exposed, said method comprising the steps of:

directing said light beam from said light source device through said polarizer, said magnetooptical element and said analyzer, so that a plane of polarization of said light beam from said polarizer is rotated according to a variation in the strength of said AC magnetic field, and such that an angle of rotation of said plane of polarization is converted by said analyzer into an optical intensity signal as said optical output of the sensing head;



exposing said magnetooptical element to a reference magnetic field different from said AC magnetic field, to thereby bias said light beam while said light beam is transmitted through said magnetooptical element;

directing said optical intensity signal to said light-sensitive means, which said light sensitive means converts said optical intensity signal into said electric signal;

retrieving a first component ($E\omega$) and a second component ($E_{2\omega}$) of said electric signal which is produced by said light-sensitive means, said first component ($E\omega$) having a same angular frequency as that of said AC magnetic field, while said second component ($E_{2\omega}$) having an angular frequency which is two times that of said AC magnetic field; and

determining the strength of said AC magnetic field, based on said first and second components ($E\omega$) and ($E_{2\omega}$).

4,956,608

APPARATUS FOR PROPAGATING A QUENCH IN A SUPERCONDUCTING MAGNET

Bizhan Dorri, Clifton Park; Dan A. Gross, Schenectady, and Lembit Salasoo, Delanson, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

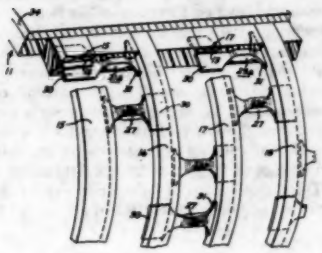
Filed May 1, 1989, Ser. No. 345,333
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—319 **23 Claims**

1. A superconductive magnet for use in magnetic resonance imaging and spectroscopy comprising:

a coil form having a plurality of superconductive coils situated coaxially on the coil form spaced apart from one another; and

a plurality of pairs of thermal bridges, each of said thermal bridges comprising a bar shaped section connecting a first and second end portion, said first end portion having a surface area greater than the second end portion, each of said pairs of thermal bridges situated between a respective pair of adjacent coils, said bar sections of each of the pairs extending in the direction of the magnet's field generated when the coils are energized, between the adjacent coils, said first end of one of said pair and the second end of the other of said pair in thermal contact with one of the adjacent pair of coils, said second end of one of said pair of thermal bridges and the first end of said other thermal

bridge in thermal contact with the other coil of the adjacent pair, so that each thermal bridge of the pair acts as a



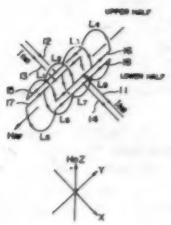
heat flux amplifier in an opposite direction between the adjacent coils.

4,956,609

DIVISIBLE COIL SYSTEM FOR NMR IMAGING APPARATUS

Goh Miyajima, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,996
Claims priority, application Japan, Oct. 12, 1987, 62-254539
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—322 **38 Claims**



1. In a nuclear magnetic resonance signal detecting system in which a body subject to measurement placed in a static magnetic field is irradiated with a magnetic field of high frequency by means of a high-frequency magnetic field radiating coil and in which a nuclear magnetic resonance signal of said body is detected by means of a nuclear magnetic resonance signal detecting coil,

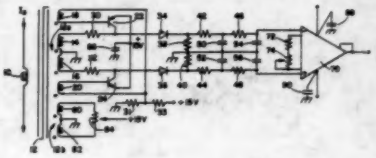
a high-frequency coil system for the nuclear magnetic resonance comprising a plurality of coil groups including a plurality of coils juxtaposed to on another in a predetermined direction in one of a loop-like form and a solenoid-like form around the predetermined direction, each of the plurality of coils being implemented in such a structure as to be divisible in a direction orthogonal to the predetermined direction, for detecting a magnetic field in an axial direction coinciding with an axis extending through said coil groups and/or generating a magnetic field in said axial direction.

4,956,610

CURRENT DENSITY MEASUREMENT SYSTEM BY SELF-SUSTAINING MAGNETIC OSCILLATION

James M. Galm, Chardon, and Mark E. Podany, Parma Heights, both of Ohio, assignors to PGM Diversified Industries, Inc., Parma Hts., Ohio

Filed Feb. 12, 1988, Ser. No. 155,205
Int. Cl.[5] G01N *27/42*; G01R *33/00*
U.S. Cl. 324—425 **34 Claims**



1. A current measuring device comprising:

a transformer adapted for placement within a secondary flux source;

an oscillator for periodically placing said transformer in forward and reverse flux saturation by application of a periodic voltage to an input winding thereof, whereby a period of the forward and reverse flux saturation is affected by the secondary flux source;

a pair of multi-section low pass filters operatively connected to an output winding of the transformer for generating an output signal including a slowly varying DC signal proportional to an on time of said transformer; and,

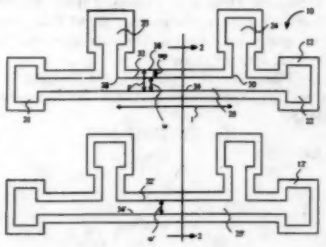
amplifier means for processing the output signal of said pair of multi-section low pass filters, wherein said amplifier output is representative of a current sensed by said transformer.

4,956,611

ELECTRICAL MEASUREMENTS OF PROPERTIES OF SEMICONDUCTOR DEVICES DURING THEIR MANUFACTURING PROCESS

Ron Maltiel, 933 Eichler Dr., Mountain View, Calif. 94040

Filed Apr. 26, 1989, Ser. No. 343,755
Int. Cl.[5] G01R *27/22, 27/26, 31/16*
U.S. Cl. 324—699 **14 Claims**



1. A method comprising the steps of:

constructing a structure on a substrate, said structure serving as the walls of a moat;

introducing an electrically conductive liquid into said moat so that said liquid is confined by said structure; and

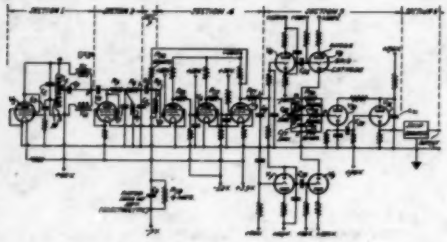
measuring the electrical resistance exhibited by said liquid between a first location within said moat and a second location within said moat, said second location being laterally displaced relative to said first location.

4,956,612

MAGNETIC MINE FIRING CIRCUIT

Robert L. Haynes, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1945, Ser. No. 602,618
Int. Cl.[5] F42B *22/04*
U.S. Cl. 328—5 5 Claims



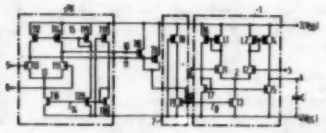
5. A control device including a circuit for deriving a direct current signal which is a measure of changes in the strength of a magnetic field, a first gas tube channel connected to respond to a change in said signal in one direction, a second gas tube channel parallel with the first and connected to respond to a change in said signal in the opposite direction, a network for retaining and combining the outputs of said channels, a third gas tube channel connected to respond to a predetermined value of the output of said network, a utilization circuit forming the output of said third channel, said network comprising three resistor capacitor combinations connected in star, one of said combinations being connected in the output circuit of said first gas tube channel, another of said combinations being connected in the output of said second gas tube channel, and the values of the elements of said combinations being chosen to fire said third gas tube channel in response to firing of one of either said first or said second channels within a predetermined period after firing of the other of said first or second channels.

4,956,613

DIFFERENTIAL AMPLIFIER HAVING EXTERNALLY CONTROLLABLE POWER CONSUMPTION

Bedrich Hosticka, Duisburg; Roland Klinke, Dortmund, and Hans-Joerg Pfleiderer, Zorneding, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 16, 1989, Ser. No. 367,268
Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824832
Int. Cl.[5] H05F *3/45*
U.S. Cl. 330—253 8 Claims



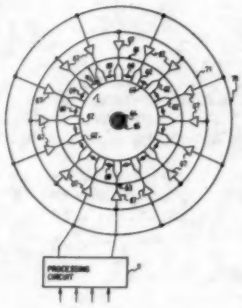
1. A differential amplifier having first and second parallel circuit branches each of which contains a load element (L1, L2) and a field effect transistor (T1, T2), respectively, and having a field effect transistor (T3) serving as a current source that is connected via a first circuit node to the first and second parallel circuit branches (L1, T1; L2, T2) and whose gate terminal is connected to a bias that defines the quiescent currents flowing in these circuit branches, comprising a circuit stage for setting the quiescent currents having an output-side resistor connected to a gate terminal of the field effect transistor (T3) serving as the current source; two additional field effect transistors (T10, T11) of a p-channel type connected in series with the output-side resistor; and a level-converting circuit having an input connected to gate terminals of the field effect transistors (T1, T2) in the parallel circuit branches, that, further, converts the DC part of an input signal to a higher output level that roughly corresponds to the value of the threshold voltage of the two additional field effect transistors (T10, T11) and that has an output side connected to gate terminals of the two additional field effect transistors (T10, T11).

4,956,614

DEVICE INCLUDING A RADIAL COMBINER FOR ELECTROMAGNETIC WAVES

Michel Baril, Lesigny, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 30, 1988, Ser. No. 175,193
Claims priority, application France, Apr. 3, 1987, 87 04726
Int. Cl.[5] H03F *3/60*
U.S. Cl. 330—286 10 Claims



1. An electromagnetic wave transmitting device comprising:
a radial combiner;
a plurality of inputs connected to said radial combiner;
a plurality of impedance matchers, with each impedance matcher being connected between the radial combiner and a corresponding one of said plurality of inputs;
said radial combiner having an output connected to a waveguide;
a plurality of transmitting means each connected to a corresponding one of said plurality of inputs;
a plurality of resistors connecting impedance matchers which are at the same potential during normal operation;
said plurality of inputs arranged into at least two groups with at least one input in each group, a first group comprising certain ones of said plurality of inputs and receiving a first input signal from corresponding transmitting means connected thereto and a second group comprising certain other ones of said plurality of inputs and receiving a second input signal different from said first input signal from corresponding transmitting means connected thereto;
a control circuit connected to the transmitting means of at least one of said groups to modify the corresponding input signal;
wherein nonidentical signals of each group are combined to produce an output.

10. The device as claimed in claim 1, wherein said transmitting means is an amplifier.

4,956,615

INPUT CIRCUIT FOR HIGH-FREQUENCY AMPLIFIERS

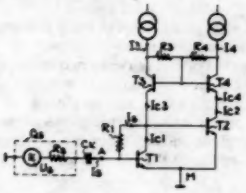
Rolf Böhme, Bad Friedrichshall, and Günter Gleim, Villingen-Schwenningen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen and Telefunken electronic GmbH, Heilbronn, both of, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,406

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824556

Int. Cl.[5] H03F 3/04

U.S. Cl. 330—288 14 Claims



1. An input circuit for high-frequency amplifiers including first, second, third and fourth transistors of the same conductivity type, and wherein: the emitters of said first and second transistors are connected to a reference point; the base of said first transistor forms the input of said circuit; the base of said second transistor is connected to the collector of said first transistor; the collector of said first transistor is connected to the emitter of said third transistor; the collector of said second transistor is connected to the emitter of said fourth transistor; the bases of said third and fourth transistors are connected to one another; the collector of at least one of said third and fourth transistors is connected to a current supply; the collector of said third transistor is connected to the base of said third transistor; the collector of said fourth transistor is connected to the base of said fourth transistor; and at least one of said collector-base connections of said third and fourth transistors is effected via a resistor.

4,956,616

MUTING CIRCUIT FOR AUDIO AMPLIFIERS

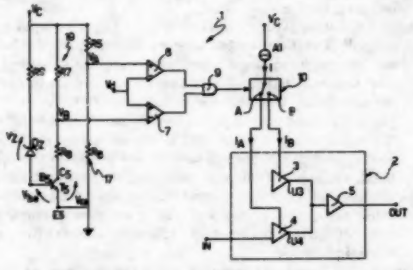
Edoardo Botti, Mortara, Italy, assignor to SGS—Thomson Microelectronics s.r. 1.

Filed May 31, 1989, Ser. No. 359,363

Claims priority, application Italy, Jun. 2, 1988, 20848 A/88

Int. Cl.[5] H03F 1/26

U.S. Cl. 330—297 11 Claims



1. An audio amplifier circuit comprising first and second input stages having parallel-connected outputs, and output stage having an input connected to the parallel-connected outputs of the first and second stages and an output, said second input stage having an input, means for connecting a signal to the second stage input, a supply voltage and a current source connected in series, switching means connecting the current source to each of the first and second stages, comparator means connected to the switching means, a reference voltage connected to the comparator means, means for connecting the supply voltage with a time delay to the comparator means, said comparator means being operative to switch the switching means between the first and second stages in response to a comparison of the reference voltage to predetermined voltage values lower than that of the supply voltage.

4,956,617

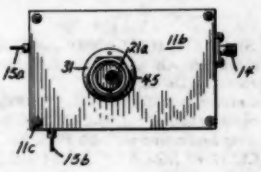
MECHANICAL ADJUSTMENT ARRANGEMENT FOR DIELECTRIC RESONATOR OSCILLATOR

Daniel P. Bowlds, County of Daviess, Ky., assignor to MPD, Inc., Owensbor, Ky.

Filed Apr. 10, 1989, Ser. No. 335,766

Int. Cl.[5] H03B 5/18, 7/12, 7/14; H01P 7/10

U.S. Cl. 331—96 8 Claims



1. An arrangement for mechanically adjusting a dielectric resonator mounted on a base member in a control relationship with circuitry for an oscillator comprising an opening extending through said base member, a first member rotatably disposed on one side of said base member over said opening and presenting an off-center opening extending therethrough, a second member rotatably disposed on the other side of said base member over said opening and presenting an off-center dielectric resonator extending in one direction and a centrally disposed stem extending in an opposite direction and through said off-center opening in said first member, whereby said dielectric resonator is movable along both X and Y coordinates, and means securing said stem and said dielectric resonator at a selected X and Y coordinate location.

4,956,618

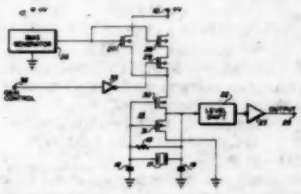
START-UP CIRCUIT FOR LOW POWER MOS CRYSTAL OSCILLATOR

Richard W. Ulmer, Tempe, Ariz., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Apr. 7, 1989, Ser. No. 334,845

Int. Cl.[5] H03B 5/36

U.S. Cl. 331—116 FE 18 Claims



1. A low power MOS oscillator circuit including in combination:

first and second power supply terminals for connection to a source of operating power;

first and second complementary MOS transistors, the source-drain circuits of which are connected together in series;

resonant circuit means coupled between the drains and gates of said first and second MOS transistors;

first current source means including a first current source MOS transistor, the source-drain circuit of which is connected in series circuit with the source-drain circuits of said first and second MOS transistors between said first and second power supply terminals;

bias generator means coupled to the gate of said first current source transistor for causing a constant current flow of a predetermined amount therethrough;

second current source means connected in parallel with said first current source means and supplying more current than said first current source means; and

means for selectively rendering said second current source means operative and non-operative.

4,956,619

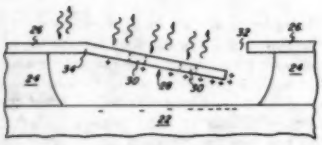
SPATIAL LIGHT MODULATOR

Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 159,466, Feb. 19, 1988, abandoned, which is a continuation of Ser. No. 636,180, Jul. 31, 1984, abandoned. This application Oct. 28, 1988, Ser. No. 266,220

Int. Cl.[5] G07F *1/29*; B44C *1/22*; C03C *15/00*

U.S. Cl. 330—4.3 **30 Claims**



1. A spatial light modulator, comprising:

(a) a plurality of pixels formed in a layered structure;

(b) said layered structure including a substrate, a spacer layer on said substrate, a reflecting layer on said spacer layer, and electrical addressing circuitry;

(c) each of said pixels including

i. an electrostatically deflectable element formed in said reflecting layer and

ii. a well formed in said spacer and located beneath said deflectable element plus adjacent portions of said reflecting layer, said well characterized by formation by plasma etching of said spacer between said substrate and said reflecting layer with said spacer on said substrate; and

(d) said reflecting layer made of conductive material.

4,956,620

WAVEGUIDE MODE CONVERTER AND METHOD USING SAME

Charles P. Moeller, Del Mar, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 17, 1989, Ser. No. 381,756

Int. Cl.[5] H01P *1/16, 3/00, 3/14*

U.S. Cl. 333—21 R **21 Claims**

1. Waveguide mode converting apparatus for converting a first mode of transmission of electromagnetic power at a given free space wavelength to a second mode of transmission at the same wavelength, said apparatus including a length of circular corrugated waveguide of predetermined inner diameter and annular corrugations formed in a multiperiod periodic planar curve with a period substantially equal to 2π divided by the difference in axial wavenumbers of the respective first and second modes of transmission in said waveguide.

21. A method for converting electromagnetic power at a given free space wavelength from a TE_{01} or TM_{02} input mode, to an HE_{11} output mode, said method comprising applying said power in said input mode to the input end of a length of circu-

lar corrugated waveguide of given inner diameter and annular corrugations formed in a multiperiod periodic planar curve, adjusting the period of said curve to maximize power radiating from the output end of said length of waveguide in said HE_{11} output mode, and adjusting the amplitude of said curve to minimize the power radiating from the output end of said length of waveguide in said input mode, thereby achieving maximum conversion to the HE_{11} mode.

4,956,621

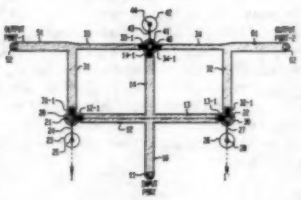
THREE-STATE, TWO-OUTPUT VARIABLE RF POWER DIVIDER

Douglas E. Heckaman, Indialantic; John E. Baker, and Walter M. Whybrew, both of Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Dec. 8, 1987, Ser. No. 129,993

Int. Cl.[5] H03H *11/36*; H01P *5/12*

U.S. Cl. 333—104 **14 Claims**



3. A signal coupling device comprising:

an input port;

a plurality of output ports;

a transmission line interconnect structure connected between said input port and said plurality of output ports;

a reference conductor spaced-apart from said transmission line structure; and

means for selectively controllably coupling said input port to each of said output ports on a selected, exclusive basis, and thereby coupling a signal that is applied to said input port to a selected, exclusive one of said output ports, on the one hand, and also for selectively controllably coupling said input port to plural ones of said output ports and thereby dividing a signal that is applied to said input port among said plural ones of said output ports, on the other hand, exclusive of said one hand, said means comprising a plurality of switching elements coupled to controllably shunt respective portions of said transmission line interconnect structure to said reference conductor; and wherein

locations within said transmission line interconnect structure that are controllably shunted by said switching elements and the configuration of said transmission line interconnect structure are such that the impedance of said transmission line interconnect structure presented to an input signal applied to said input port is the same irrespective of whether said input signal is coupled to a selected, exclu-

sive one of said output ports, on the one hand, or is coupled to plural ones of said output ports, on the other hand, when said selected, exclusive one of said output ports, on the one hand, or said plurality of output ports, on the other hand, are terminated in a prescribed impedance; and wherein

said output ports are effectively symmetrically arranged with respect to said input port and said transmission line interconnect structure is effectively symmetrically configured between said input port and said plurality of output ports, and wherein said transmission line interconnect structure is comprised of a microstrip transmission line structure.

4,956,622

WAVEGUIDE H-PLANE JUNCTIONS

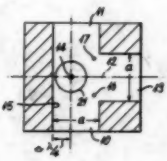
Frans C. de Ronde, Bath, United Kingdom, assignor to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 55,131, May 28, 1987, Pat. No. 4,891,614. This application Nov. 28, 1988, Ser. No. 276,844

Claims priority, application United Kingdom, May 29, 1986, 8613028; Apr. 8, 1987, 8708373; Nov. 30, 1987, 8728017

Int. Cl.[5] H01P *5/12*

U.S. Cl. 333—125 **11 Claims**



1. An H-plane junction comprising:

first, second and third rectangular waveguide portions, each waveguide portion formed by a pair of opposite wide walls and a pair of opposite narrow walls,

the waveguide portions being joined together at a junction with the first and second portions arranged end to end and the third portion opening into the junction on one side thereof along adjacent narrow walls of the first and second portions, the junction being substantially symmetrical about a plane through the third portion parallel to the narrow walls thereof,

first matching means, disposed inside said junction, for reducing the reflection of waves travelling into the junction from the third portion, and

second matching means inside the junction for reducing the variation with frequency of the reflection coefficient in the third waveguide for waves reflected from the junction including reflections from the first matching means,

said first matching means comprising an elongated conductor positioned in the said plane at a distance, from that narrow wall of the junction which is opposite the third portion, which is less than half the dimension of the wide wall of each first land second portion, the said elongated conductor being joined to two opposite wide walls of the junction.

4,956,623

ELECTROMAGNETIC RELAY

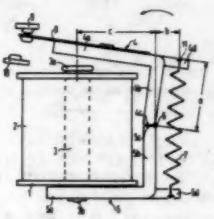
Kimpel Rolf-Dieter, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 17, 1989, Ser. No. 311,759

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805254

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—128 **5 Claims**



1. An electromagnetic relay, comprising:

a coil having a coil axis;

a core axially arranged in said coil;

a first yoke being an L-shaped armature, said first yoke having;

a first leg defining a working air gap relative to a first end of said core,

a second leg of said L-shaped first yoke lying substantially parallel to said coil axis,

an extension of said first leg extending beyond said second leg;

a contact spring coupled to said first leg of said first yoke;

a second yoke being of an L-shape, said second yoke having:

a first leg facing toward a second end of said core,

a second leg of said second yoke extending substantially parallel to said coil axis adjacent said coil, said second leg of said second yoke having a free end nest to said coil at which a free end of said second leg of said first yoke is seated next to said coil,

an extension of said second yoke;

a tension restoring spring acting upon said extensions of said first and second yokes, said tension restoring spring lying substantially parallel to said coil axis,

said second yoke being a second armature having said first leg defining a working air gap relative to said core, free ends of both second legs of said first and second yokes being seated relatively movable to one another, and

said first and second yokes having inter-engaging bearing elements.

4,956,624

AUXILIARY SWITCH ATTACHMENT BLOCK

Georg Streich, Amberg, and Guenter Gnahn, Sulzbach-Rosenberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,106

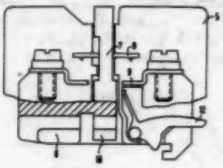
Claims priority, application Fed. Rep. of Germany, May 3, 1988, 8805878[U]

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—32 **16 Claims**

1. In an auxiliary switch attachment block for electromagnetic switchgear including a hammer head shaped, positive engagement coupling between the contact bridge carriers of the electromagnetic switchgear and the auxiliary switch, the hammer head supported on a hammer handle and the contact bridge carrier having free legs with subsurfaces below a point

of positive engagement of coupling with the hammer head, the improvement comprising the subsurfaces of the free legs of the



contact bridge carrier flanking the hammer handle extending away from the handle at an angle, starting at the hammer head.

4,956,625

MAGNETIC GRIPPING APPARATUS HAVING CIRCUIT FOR ELIMINATING RESIDUAL FLUX

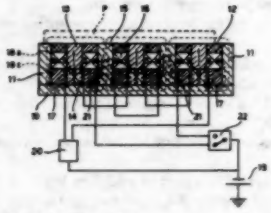
Michele Cardone; Angelo Grandini, and Bruno Zaramella, all of Milan, Italy, assignors to Tecnomagnete S.p.A., Milano, Italy

Filed May 26, 1989, Ser. No. 357,342

Claims priority, application Italy, Jun. 10, 1988, 20943 A/88

Int. Cl.[5] H01F *7/20*

U.S. Cl. 335—290 **6 Claims**



1. A magnetically gripping device for gripping ferromagnetic workpieces, comprising a base plate, peripheral walls and at least a first and second pole unit, each pole unit comprising a main pole piece having an outer face defining a gripping surface, and main permanent magnet arranged between said main pole piece and the base plate; an intermediate pole member being disposed between the main pole pieces of said pole units, said intermediate pole member extending from the base plate to the gripping surface; secondary magnets disposed between said pole member and said pole pieces and between said pole pieces and said peripheral walls the device further comprising first electrical windings encicling said main magnets and operatively connected to a control unit to activate and deactivate the device, in which a demagnetizing circuit for eliminating residual flux or remanence in the workpieces, said demagnetizing circuit comprising a demagnetizing winding encircling the above-mentioned intermediate pole member and a demagnetizing control unit to generate a progressively decreasing demagnetizing cyclical field in said intermediate pole member and between the workpiece to be demagnetized and said base plate.

4,956,626

INDUCTOR TRANSFORMER COOLING APPARATUS

Richard J. Hoppe, Rockford, and Mark W. Metzler, Davis, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 13, 1989, Ser. No. 296,830

Int. Cl.[5] H01F *27/10*

U.S. Cl. 336—60 **10 Claims**

1. An electrical device in the form of a transformer or an inductor, comprising a permeable core having at least one leg about which is wrapped at least one coil layer through which electric current flows to generate heat, and at least one metal, plate-shaped, plate-fin heat exchanger with lanced offset fins having a configuration through which said core passes, a liquid coolant and inlet admitting said liquid coolant into a path

therein and an outlet permitting said liquid coolant heated by the coil layer to exit therefrom, wherein the heat exchanger is in contact with the at least one coil layer for directly cooling the at least one coil layer and wherein said heat exchanger includes air gaps to reduce eddy current resistance losses.

4,956,627

HIGH-FREQUENCY COMPONENT

Heinz Pfizenmaier, Leonberg, and Ewald Schmidt, Ludwigsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

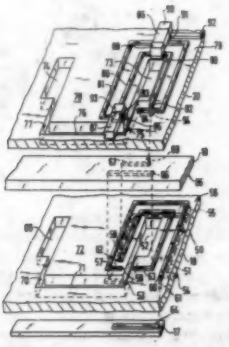
PCT No. PCT/DE88/00085, § 371 Date Jul. 19, 1989, § 102(e) Date Jul. 19, 1989, PCT Pub. No. WO88/07257, PCT Pub. Date Sep. 22, 1988

PCT Filed Feb. 18, 1988, Ser. No. 420,493

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708209

Int. Cl.[5] H01F *15/02, 27/30*

U.S. Cl. 336—65 **10 Claims**



1. A high-frequency transformer comprising at least one annular core of a magnetizable material; at least two superposed elastic carrier sheets each formed with a pair of openings adjusted for receiving corresponding cross-sectional parts of the annular core, each of the pairs of openings delimiting a strip of the corresponding carrier sheet, the strip passing through the central hole of the annular core and extending into a cutout in the corresponding carrier sheet, in such a way that it forms an elastic tongue bendable for inserting the annular core into the openings; conductor tracks mounted on opposite sides of each of the carrier sheets around at least one of the openings whereby the portions of the conductor tracks on the respective sides are separated one from the other by the cutout; an intermediate bridge sheet sandwiched between the two carrier sheets and being provided on opposite sides thereof with conductor track sections for connecting the end portions

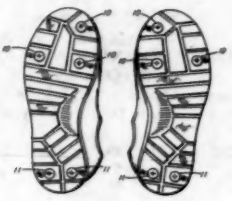
of the facing conductor tracks; two outer bridge sheets connected to the free outer sides of the carrier sheets and each being provided on one side thereof with conductor track sections for connecting the end portions of the facing conductor tracks on the free outer sides to complete primary and secondary coil turns around the annular core.

4,956,628

ELECTRONIC MONITORING OF GROUND CONTACT BY AN ATHLETE'S SHOES

Dennis Furlong, Box 1990 Dalhousie, New Brunswick, Canada E0K-1B0

Filed Aug. 4, 1988, Ser. No. 228,036
Claims priority, application Canada, Aug. 7, 1987, 544054
Int. Cl.[5] G08B *23/00*; A63B *5/00*
U.S. Cl. 340—323 R 16 Claims



1. Electronic athlete's shoe monitoring apparatus, comprising:

pressure sensitive means in each shoe of a pair, the pressure sensitive means being reactive to pressure on contact of a shoe with the ground;

signal generating means on each shoe and connected with said pressure sensitive means for producing a signal indicative of contact conditions between each shoe and the ground;

transmitting means on one shoe for transmitting the signal generated on said one shoe;

receiving means on the other shoe for receiving the signal from said one shoe;

a signal path between said transmitting means and said receiving means, said signal path including a connection through a body of a user; and

indicating means on said other shoe, said indicating means actuated from both shoes indicative of non-contact between the shoes and the ground, said indicating means including latch means for latching said indicating means ON in response to said non-contact between the shoes and the ground.

4,956,629

BURGLAR PROOF DEVICE FOR AUTOMOBILE USE

Michael Chen, 10F-3, No. 230, Nanking E. Road Sec. 5, Taipei, Taiwan

Filed Feb. 3, 1989, Ser. No. 305,977
Int. Cl.[5] B60R *25/10*
U.S. Cl. 340—429 4 Claims

1. An improved burglar proof device adapted for automobile use which can be instantly actuated to make a connected alarm function, comprising:

a. a connection terminal;

b. a circular ring-shaped washer;

c. a first sealing ring;

d. a second sealing ring;

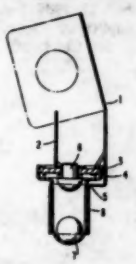
e. a rivet;

f. a steel ball;

g. a torch-shaped metallic casing; and

h. a mounting seat;

wherein said connecting terminal, said circular washer and said second sealing ring are engaged with said rivet in a consecutive order; and in combination with said first sealing ring and said steel ball, said connection terminal, said circular washer, said second sealing ring, and said rivet are received in said torch-shaped casing with said steel ball disposed at the bottom thereof and kept at a distance with said rivet in non-operation state; and said steel ball is movable toward said rivet as a result of gravitation force exerted thereon once the metallic casing is tilted at a specific angle; said torch-shaped metallic casing is removably secured to said mounting seat which is then detachably disposed on the inner side of an engine hood or a trunk lid and wherein said connection terminal is defined as L-shaped with one end thereof connected to an alarm and the other end provided with a through hole, permitting the passage of the tip of said rivet.

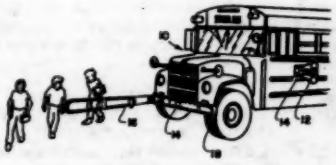


4,956,630

SAFETY UNIT ACTUATING DEVICE

James H. Wicker, Charlotte, N.C., assignor to Specialty Manufacturing Co., Inc., Charlotte, N.C.

Filed Sep. 8, 1989, Ser. No. 404,789
Int. Cl.[5] B60Q *1/46*
U.S. Cl. 340—433 14 Claims



1. An actuating device for operating a safety unit which is mounted on a vehicle and normally carried at a retracted position adjacent said vehicle, said actuating device including:

(a) means for mounting said actuating device on said vehicle;

(b) motor means having an output drive means;

(c) support means for supporting said safety unit for movement with respect to said vehicle, said support means being arranged to normally dispose said safety unit at said retracted position thereof and being pivotally movable by said motor means to move said safety unit between said retracted position and an extended position away from said vehicle in and through a predetermined path of movement and

(d) control means for operating said motor means, said control means having a first energized condition for continuously moving said support means back and forth between said retracted and extended positions thereof in a continuous sweeping motion to cause said safety unit to form a continuously moving barrier within a predetermined area adjacent said vehicle, and a second de-energized condition at which said continuous sweeping movement is discontin-

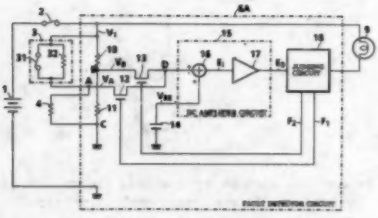
ued and said safety unit is positioned at said retracted position thereof.

4,956,631

FAULT DETECTOR FOR VEHICLE SAFETY SYSTEM

Hisatsugu Itoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 410,874
Claims priority, application Japan, Mar. 20, 1989, 1-66071
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 340—436 **13 Claims**



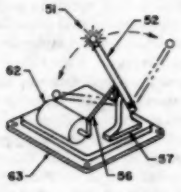
1. A fault detector for a vehicle safety system, comprising:
a first series circuit having a squib resistor and a resistor connected thereto at a junction A;
a second series circuit having a pair of resistors connected to each other at a junction B having the same resistance ratio as that of the first series circuit for providing a balanced wheatstone bridge with said first series circuit in parallel connection thereto;
a DC power source for supplying electric power to the wheatstone bridge;
a pair of switching circuits connected separately to the junctions A and B for alternative switching;
a DC amplifier circuit connected to a common output of said switching circuits; and
a judging circuit for determining existence of a fault in the squib resistor based on a difference of the output voltages of the DC amplifier circuit being switched synchronously with the alternative switching of said switching circuits.

4,956,632

MULTIPLE PURPOSE ELECTROMECHANICAL VEHICLE SIGNAL DEVICE

John M. Perrigo, 5431 Crestview Dr., Chattanooga, Tenn. 37343

Filed May 9, 1989, Ser. No. 349,486
Int. Cl.[5] B60Q *1/22, 1/44*
U.S. Cl. 340—463 **3 Claims**



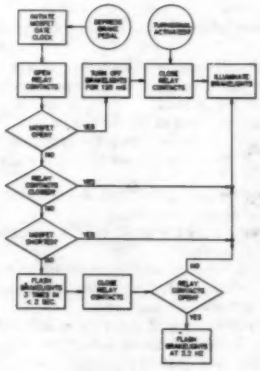
1. A vehicle with an improved rear-mounted signal device consisting of a brake light including a double filament light bulb attached to a moving rod;
a variable speed drive unit connected to the moving rod for moving the brake light at various speeds;
a motion detector unit to detect a change in speed of the vehicle in response to rapid braking;
an electronic circuit with a relay, which is responsive to the vehicle brake light circuit to energize the variable speed drive unit at a slow speed and to operate a first filament in said bulb to provide a dim slow moving brake light signal;
said electronic circuit being responsive to said motion detector unit to energize the variable speed drive unit at a second, fast speed while energizing a second filament in said bulb, with said first filament remaining on, to provide a second bright, fast moving flashing brake light signal to indicate a rapid or an emergency deceleration of the vehicle when the brakes are applied;
said electronic circuit being powered by the vehicle's battery;
said device including a case with a wrap around lens and a curved reflector to increase the visibility of the brake light to the sides and rear of the vehicle.

4,956,633

BREAK LIGHT ENHANCER WITH FAIL SAFE PROTECTION

Charles K. Waterson, Chapel Hill, N.C., and Richard Vercillo, Tucson, Ariz., assignors to Dr. Fernald Wentzell, Oceanside, Calif.

Filed Nov. 14, 1989, Ser. No. 436,498
Int. Cl.[5] B60Q *1/52*
U.S. Cl. 340—471 **9 Claims**



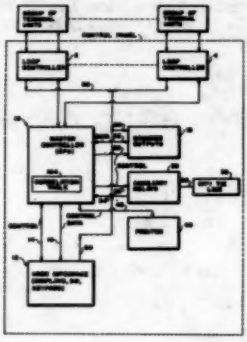
1. In a brake light enhancer circuit for a motor vehicle having left and right rear brake lamps normally continuously illuminated by manual closure of a brake light switch connected between the brake lamps and electric power source, and having left and right rear turn signal lamps which are selectively caused to flash intermittently by connecting thereto a flasher also connected to the electric power source through manual actuation of a turn signal switch from a neutral position, the brake light enhancer circuit being adapted to be connected between the brake light switch, the brake lamps and the turn signal flasher for causing the brake lamps to flash on and off a predetermined number of times when the turn signal switch is in a neutral position upon closure of the brake light switch and for causing the brake lamps to thereafter remain continuously illuminated during the remainder of the time that the brake light switch is closed, the improvement comprising:
an electro-mechanical relay and a solid state switching device connected in parallel to the brake lights so that the brake lamps are flashed on and off by switching of the solid state switching device when the relay is in a predetermined condition.

4,956,634

CITY TIE LINE CONNECTION FOR FIRE ALARM SYSTEM

Robert W. Right, Huntington, Conn., assignor to General Signal Corporation, Stamford, Conn.

Filed May 1, 1989, Ser. No. 345,598
Int. Cl.[5] G08B 19/00
U.S. Cl. 340—521 4 Claims



1. Apparatus for selectively connecting a city tie line to the fire alarm system;

a plurality of transmission loops;

a plurality of terminal units connected to each of said transmission loops;

each of said terminal units having comparison means for determining whether a received address signal coincides with an identification address stored in the terminal unit, said comparison means producing an output signal responsive to coincidence;

loop controllers connected to the respective transmission loops for transmitting address signals thereon;

a master controller for receiving data from said loop controllers as to the alarm status of said terminal units;

a city tie line for connecting to municipal fire authorities;

means forming part of said master controller, including a correlation table, for selectively connecting, in response to particular terminal units being in alarm, said city tie line to provide a warning to the municipal fire authorities concerning those terminal units;

an auxiliary relay for enabling the selective connection of said city tie line.

4,956,635

METHOD AND APPARATUS FOR TESTING PERSONAL BARRIERS

Robert S. Langdon, 29 Beaver La., Bedford, N.H. 03102

Filed Apr. 14, 1989, Ser. No. 339,129
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—540 16 Claims

9. Apparatus for testing the integrity of a personal barrier worn by a human comprising:

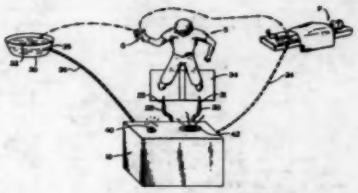
reference circuit means comprising first and second terminal means for establishing a reference external circuit traversing a portion of a human between said first and second terminal means;

test circuit means comprising third terminal means for establishing a test external circuit between said first and third terminal means;

verification means for continuously verifying the presence of the reference external circuit;

status signal means responsive to said verification means for signaling the verification of said reference external circuit;

detection means for detecting the existence of a conductive path connecting said first terminal and said third terminal through the human and the personal barrier thereby indicating a lack of integrity of the personal barrier; and



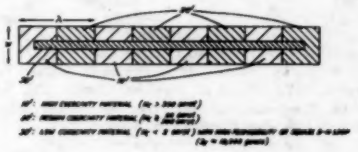
alarm means responsive to said detection means for signaling the existence of said conductive path and the lack of the integrity of the personal barrier.

4,956,636

E.A.S. TAG HAVING A CONTROL COMPONENT WITH SELECTIVELY MAGNETIZEABLE REGIONS

David J. Sansom, Chertsey; Simon N. M. Willcock, High Wycombe, and Robert A. Woolley, Uxbridge, all of England, assignors to Thorn Emi plc, London, England

Filed Aug. 9, 1989, Ser. No. 390,993
Claims priority, application United Kingdom, Aug. 9, 1988, 8818849
Int. Cl.[5] G08B 13/24
U.S. Cl. 340—551 11 Claims



1. A tag for use with an electromagnetic identification system, the tag comprising an element of magnetically soft material and, in magnetic communication therewith for enabling polarisation of the element, a magnetic control component including first and further regions having, respectively, first and further magnetic characteristics for enabling magnetisation or demagnetisation of first or further regions independently of the other regions.

4,956,637

SYSTEM FOR DETECTING IRREGULAR OPERATION OF SWITCH STATE VERIFICATION CIRCUIT

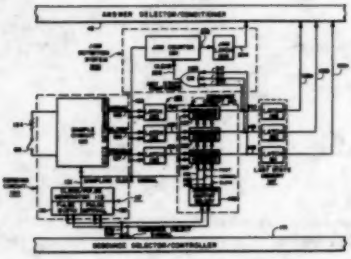
William R. Vogt, Rockaway, N.J., assignor to Baker Industries, Inc., Parsippany, N.J.

Filed Apr. 29, 1988, Ser. No. 187,681
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—644 8 Claims

1. For use with an arrangement for monitoring and indicating the condition of a switch having at least two possible states, sampling the switch state to provide a status signal connoting the switch state and thereafter examining the status signal to provide a confirmation signal upon verifying the status signal, a system for identifying irregular system operation, including:

first means to accumulate a count of data signals related to switch state sampling, to receive the confirmation signal, and to provide an output signal denoting irregular system operation when the accumulated count reaches a predetermined value; and

second means, coupled to the first means to provide said confirmation signal and clear the count accumulated in



the first means upon verification that the switch is in one of its possible states.

4,956,638

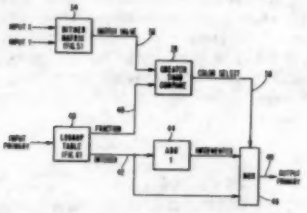
DISPLAY USING ORDERED DITHER

Steven P. Larky, Austin, Tex.; Bruce D. Lucas, Yorktown Heights, N.Y.; Daniel H. McCabe, Chapel Hill, N.C., and Todd K. Rodgers, Chappaqua, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 16, 1988, Ser. No. 245,857

Int. Cl.[5] G09G *5/02*

U.S. Cl. 340—701 **6 Claims**



1. A dither apparatus for each primary color to be displayed on a color display device, comprising:

a dither matrix which provides a dither signal output as a function of the position of a pixel on said color display device;

a lookup table which stores a set of colors and responds to a color select signal to provide an integer signal output and a fractional signal output;

an incrementer which increments said integer signal to provide an incremented signal; and

means for providing a primary color signal which is said incremented signal whenever a predetermined relationship exist between said dither signal and said fractional signal, and which is said integer signal whenever said predetermined relationship does not exist.

4,956,639

DISPLAY DATA PROCESSING DEVICE

Susumu Uemura, Kyoto; Hiroshi Tsujioka, Nara; Yasuhumi Yatsuzuka, Yamatokoriyama; Tadashi Tomino, Yamatokoriyama; Shigeo Yoneda, Yamatokoriyama, and Shigeru Shindoh, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

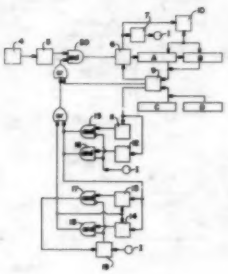
Continuation of Ser. No. 944,511, Dec. 22, 1986, abandoned.

This application Aug. 30, 1989, Ser. No. 401,504

Claims priority, application Japan, Dec. 23, 1985, 60-294969

Int. Cl.[5] G09G *1/00*

U.S. Cl. 340—707 **9 Claims**



1. A display data processing device for processing coded data displayed on a display screen in an interlaced scanning manner, comprising:

means for reading said coded data displayed on said display screen;

means for determining whether the coded data read by said means for reading is displayed by an odd-number field or an even number field and producing a signal corresponding to the result of the determination;

means for storing the coded data read by said means for reading in first and second storage means in response to the signal produced by said means for determining; and

means responsive to the signal produced by said means for determining for synchronizing the storage of data in said first and second storage means with the timing of an odd-number field scanning or an even-number field scanning.

4,956,640

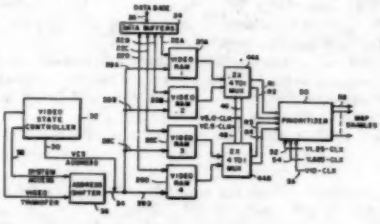
METHOD AND APPARATUS FOR CONTROLLING VIDEO DISPLAY PRIORITY

Richard H. Jundanian, and David C. Hempstead, both of Methuen, Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 28, 1988, Ser. No. 276,972

Int. Cl.[5] G09G *1/02*

U.S. Cl. 340—799 **12 Claims**



1. In a video display system adapted to display on a video

monitor having a plurality of display pixels a plurality of different types of information, each having a selected priority, means for controlling the type of information displayed at each display pixel comprising:

a number of video RAMs which is at least equal to the number of said different types of information;

means for storing a bitmap for each of said information types in said RAMs in interspersed fashion, a selected number of bits for selected display pixels of the bitmap for a given type of information being simultaneously stored in said RAMs followed for each RAM by the selected number of bits for the same selected display pixels for the bitmap of at least one other information type, no more than one bitmap bit for a given display pixel being stored in any video RAM;

means operative for shifting the addressing of said RAMs for read out of the bitmaps so that bits for the same display pixels of all the bitmaps are simultaneously readout from said RAMs; and

prioritizer means responsive to the bits of the bitmaps for each display pixel for determining and generating an indication of the type of information which has priority and is to be displayed at the display pixel.

4,956,641

RADIO PAGING DEVICE HAVING CIRCUITRY OF REWRITING A STORED MESSAGE WITH ERROR-FREE CHARACTERS

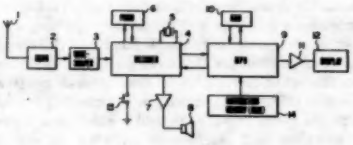
Masahiro Matai; Takashi Oyagi; Yutaka Ichikawa, and Shinjiro Umetsu, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation-in-part of Ser. No. 833,095, Feb. 25, 1986, abandoned. This application Apr. 8, 1988, Ser. No. 179,254

Claims priority, application Japan, Feb. 28, 1985, 60-37595

Int. Cl.[5] G08B *5/22*

U.S. Cl. 340—825.44 **9 Claims**



1. A radio display pager having a receiver for receiving a paging signal containing and address and a message and means for detecting when the address in the received paging signal coincides with a unique address assigned to the pager, wherein the message comprises a series of characters, said pager comprising:

means responsive to the detection of a coincidence between the received address and the unique address for detecting an error in each character of the received message, for identifying those characters having no error as being error-free characters, and for identifying those characters in error as being error-containing characters;

memory means having a first storage area for storing therein a received message and a plurality of second storage areas for respectively storing therein a plurality of different messages which are received in succession prior to the reception of the message in the first storage area, each of the messages stored in the first storage area and the second storage areas containing both the error-free and error-containing characters, the characters stored in the first storage area in order respectively corresponding in position to those stored in each of the second storage areas; and

control means for (a) detecting a mismatch between each of the error-free characters in the first storage area and each of the positionally corresponding error-free characters in each of the second storage areas, for shifting all characters from each of the second storage areas to the next storage area of said plurality of second storage areas in order to vacate a storage area, and for shifting all characters from the first storage area to the vacated storage area and (b) detecting a match between each of the error-free characters in the first storage area and each of the positionally corresponding error-free characters in one of the second storage areas and replacing characters in said one of the second storage areas with all the positionally corresponding error-free characters in the first storage area.

4,956,642

SUPERCONDUCTING ANALOG TO DIGITAL CONVERTER

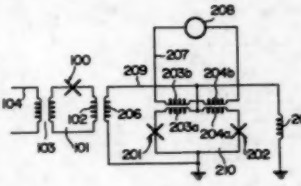
Yutaka Harada, Tokyo, Japan, assignor to Research Development Corporation of Japan, Tokyo, Japan, a part interest

Filed Nov. 22, 1988, Ser. No. 274,493

Claims priority, application Japan, Nov. 24, 1987, 62-295780

Int. Cl.[5] H03K *13/02*

U.S. Cl. 341—133 **10 Claims**



1. A superconducting analog to digital converter comprising a plurality of comparators each of which includes:

a quantum flux parametron having a superconducting loop with a first and second Josephson devices and two exciting inductors, a first load inductor connected to the superconducting loop, and means for supplying exciting current to inductors inductively coupled with said exciting inductors and

an rf-SQUID comprising a superconducting loop with a second load inductor and a third Josephson device, whereby input signals are supplied to the quantum flux parametron through the rf-SQUID.

4,956,643

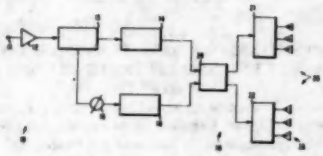
TRANSPONDER WITH SELECTIVE ANTENNA BEAM USING SHARED ANTENNA FEED ELEMENTS

Carl J. Hahn, III, Inglewood, and Arnold L. Berman, Los Angeles, both of Calif., assignors to HAC, Los Angeles, Calif.

Filed May 2, 1989, Ser. No. 346,105

Int. Cl.[5] H04J *3/06*; G01S *9/00*

U.S. Cl. 342—51 **10 Claims**



1. A transponder comprising:

amplifier means for amplifying signal energy;

a variable power divider coupled to the amplifier means for variably coupling power along two output paths;

phase delay means disposed in one output path; and

an antenna feed network comprising an energy distribution network and a plurality of antenna elements and coupler means coupled to the two output paths for selectively

coupling energy to the plurality of antenna elements and to a selected subset of the plurality of antenna elements;

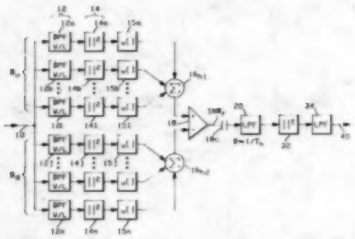
whereby selective control of the ratio of the power coupled to the respective output paths, and the phase delay provided by the phase delay circuit, provides for selective coupling of the power provided by the transponder to either the plurality of antenna elements or the selected subset of antenna elements, which selective coupling generates first and second predetermined beams radiated by the selected antenna elements.

4,956,644

CHANNELIZED BINARY-LEVEL RADIOMETER

Ronald S. Leahy; Patrick J. Smith, both of Salt Lake City, Utah, and Scott R. Bullock, Cos, Colo., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 4, 1989, Ser. No. 417,124
Int. Cl.[5] G01S *3/02*
U.S. Cl. 342—351 **11 Claims**



1. A detector for sensing the presence of a frequency-hopped signal comprising in combination:

(a) means for channelizing a frequency-hopped input signal into a plurality of channels having separate and individual frequency bands;

(b) amplification-quantization means, connected in each channel for detecting the power level of the frequency signals present in that band and quantizing said power level to a binary signal;

(c) first connection means for connecting the outputs of one-half of the channels into a first totalizing circuit means;

(d) second connection means for connecting the second half of said channels into a second totalizing circuit means;

(e) combining means for subtracting the totalized output of said second totalizing means from the output of said first totalizing means;

(f) means for providing a DC output voltage which indicates the presence of a frequency-hopped signal being transmitted.

4,956,645

RADIO SYSTEM FOR DATA TRANSMISSION WITH ONE PASSIVE END AND STATION INCLUDED IN SUCH A SYSTEM

Jean Guena, Trebeurden; Jean-Claude Leost, Perros-Guirec, and Sylvain Meyer, Lannion, all of France, assignors to Etat Francais represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications), Issy-Les-Moulineaux, France

Filed May 15, 1989, Ser. No. 351,234
Claims priority, application France, May 20, 1988, 88 06794
Int. Cl.[5] H01Q *21/06, 21/24*
U.S. Cl. 342—361 **11 Claims**

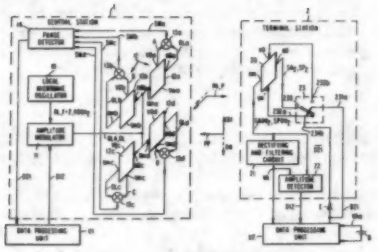
1. A radio system for alternatively transmitting by microwaves first and second data signals (D12, D21) between first and second data processing units (U1, U2) connected to said radio system, said first data signal (D12) being transmitted from said first unit (U1) to said second unit (U2) during first data transmission periods, and said second data signal (D21) being transmitted from said second unit (U2) to said first unit (U1) during said second data transmission periods,

said system comprising data signal transmitting and receiving central and terminal stations (1, 2),

said transmitting and receiving central station (1) being connected to said first unit (U1) for emitting a first microwave (PA) modulated by said first data signal (D12) during said first transmission periods and a second unmodulated microwave (P) during said second transmission periods to said terminal station, said first and second emitted microwaves (PA, P) having a first linear polarization,

said transmitting and receiving terminal station (D) being connected to said second unit (U2) and comprising:

an antenna (20) having two first ports (HO, Hπ) arranged to transduce said first linear polarization and two second



ports (Vπ, VO) arranged to transduce a second linear polarization, the second linear polarization being relative to said first linear polarization,

means (21, 22) connected to one (Hπ) of said first antenna ports for detecting said first data signal (D12) in the first modulated microwave (PA) thereby applying a replica of said first data signal to said second unit (U2), and

a microwave switcher (23) having an input (230) connected to the other (HO) of said first antenna ports and two outputs (232*a*, 232*b*) respectively connected to said second antenna ports (Vπ, VO), said second data signal (D21) controlling said microwave switcher so said switcher derives in response to said second microwave (P) received via said switcher input (230), a third microwave (PP) modulated in two phase states by said second data signal (D21) and transmitted according to said second polarization by said antenna (20) towards said central station (1) during said second data transmission periods.

4,956,646

DEPLOYMENT APPARATUS AND METHOD FOR RADIOSONDES

Edward J. Miller, Richboro, Pa.; John M. Beukers, Stony Brook, N.Y., and Maurice Friedman, Roslyn, Pa., assignors to VIZ Manufacturing Company, Philadelphia, Pa.

Filed Oct. 17, 1988, Ser. No. 258,655
Int. Cl.[5] H01Q *1/30*
U.S. Cl. 343—706 **23 Claims**

1. Deployment apparatus comprising, in combination:

a housing containing a brake drum and a compartment;

brake means having radially movable members carried on a shaft rotatably mounted in said drum, said members frictionally engaging the inner surface of said drum in response to the centrifugal force caused by a predetermined rate of rotation of said shaft;

a cord stored in said compartment having one end fixed thereto, and the other end routed through said drum for attaching to an object, the portion of said cord passing through said drum being wrapped around said shaft; and

snubbing means fixed to said housing between said compartment and said drum and frictionally engaging said cord for producing drag thereat;

whereby a controlled rate of rotation is imparted to said shaft when tension in excess of the drag is applied to the other end of said cord.

4,956,647

ROD ANTENNA

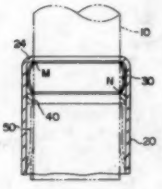
Misao Kimura, Yokosuka, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 5, 1985, Ser. No. 762,922

Claims priority, application Japan, Dec. 10, 1984, 59-153128[U]

Int. Cl.[5] H01Q *1/10*

U.S. Cl. 343—901 **3 Claims**



1. A rod antenna comprising:

an antenna element formed of a plurality of rods which are respectively different in diameters and are coupled to each other in a freely slidable manner; and

a rectangular film strip made of resin for forming a waterproof seal between the plurality of rods, the film strip being provided at least at a joint area for coupling the respective rods such that the film strip is mounted in a ring shape onto the inner circumferential surface of each of larger diameter rods, said film strip further being in contact with the inner circumferential surface of respective larger diameter rods and an outer circumferential surface of a respective smaller diameter rod.

4,956,648

DOT POSITION DISCREPANCY CORRECTING CIRCUIT FOR PRINTING APPARATUS

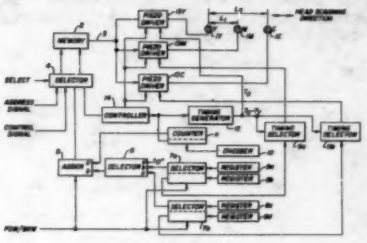
Yutaka Hongo, Tokyo, Japan, assignor to Seiko Instruments, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,485

Claims priority, application Japan, Jul. 5, 1988, 63-168432

Int. Cl.[5] G01D *15/6*; B41J *3/04*

U.S. Cl. 346—1.1 **33 Claims**



33. A method for correcting dot discrepancy of a printer having a printer head which is mounted to scan perpendicularly to a direction in which a sheet to be printed upon is fed, the printer head including a plurality of dot printing means disposed in such arrangement on said head that they are separated from one another by respective distances in the direction of head scanning, said correcting method comprising steps of:

detecting the position of the head;

generating information related to positions of the printing means on the sheet;

reading out the pixel data stored in said picture memory at addresses corresponding to the positions of the printing means relative to the sheet;

generating a plurality of printing timing signals;

selecting one of the printing timing signals in accordance with said information related to respective positions of the printing means; and

driving said printing means according to the pixel data read out in response to the selected timing signal.

4,956,649

IMAGE RECORDING APPARATUS FORMING PHOTOMASKING PATTERN ON PHOTOSENSITIVE MEDIUM

Toshio Sakai; Hitoshi Nakai; Makoto Suzuki, all of Nagoya; Kiyoharu Hayakawa, Aichi, and Kazunori Tanabe, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jan. 11, 1988, Ser. No. 141,916

Claims priority, application Japan, Jan. 13, 1987, 62-7110; Jan. 13, 1987, 62-7111; Jan. 13, 1987, 62-7112

Int. Cl.[5] G01D *9/42*; G03G *13/94*; B32B *3/00*

U.S. Cl. 346—107 R **5 Claims**

1. An image recording apparatus, comprising:

means for supporting a photosensitive recording medium, said photosensitive recording medium including a photosensitive layer sensitive to a radiation, a transparent electrically conductive layer formed on said photosensitive layer, and a transparent photoconductive layer formed on said transparent electrically conductive layer;

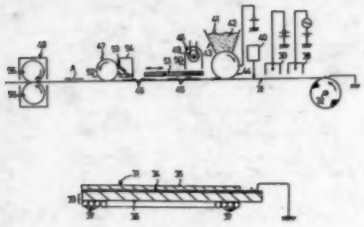
means for discharging said transparent electrically conductive layer;

a charger disposed opposite to said transparent photoconductive layer, for electrostatically charging an entire surface area of said photoconductive layer;

first irradiating means for irradiating said transparent photoconductive layer with light according to image information, and thereby discharging through said electrically

conductive layer and the grounding means an electrostatic charge from local portions of said entire surface area of said photoconductive layer, so as to form as a preliminary latent image an electrostatically discharged pattern on said photoconductive layer, said light being incapable of exposing said photosensitive layer to form an optical latent image thereon;

means for applying a light-shielding material directly to the irradiated layer, so as to form as a light-shielding pattern a visible photomasking pattern corresponding to said preliminary latent image, said light-shielding material being capable of shielding a radiation;



second irradiating means for irradiating the imagewise marked surface of said transparent photoconductive layer with said radiation, and thereby forming on said photosensitive layer an optical latent image corresponding to said photosensitive pattern;

cleaning means for removing said photomasking pattern from the photosensitive recording medium after said optical latent image is formed; and

developing means for developing said optical latent image into a visible image.

4,956,650

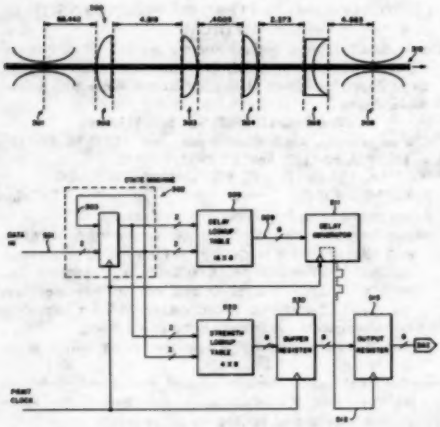
PATTERN GENERATION SYSTEM

Paul C. Allen, Beaverton; Robin Teitzel, Portland, and Timothy Thomas, Lake Oswego, all of Oreg., assignors to ATEQ Corporation, Beaverton, Oreg.

Filed Aug. 26, 1988, Ser. No. 237,753

Int. Cl.[5] G01D *15/16*; H04N *1/21*; G02B *3/04*; A61N *5/00*

U.S. Cl. 346—108 **11 Claims**



1. In a pattern generation apparatus, said pattern generation apparatus having a radiant energy source for providing a radiant energy beam for generating a pattern on a workpiece, an improvement comprising an optical stigmator means for correcting astigmatism and ellipticity in said radiant energy beam;

wherein said optical stigmator means comprises a plurality of optical lenses;

wherein said plurality of optical lenses comprises:

a first lens having a substantially convex surface oriented toward the source of said radiant energy beam and a substantially planar surface oriented away from the source of said radiant energy beam;

a second lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially cylindrical convex surface oriented away from the source of said radiant energy beam;

a third lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially convex surface oriented away from the source of said radiant energy beam;

a fourth lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially cylindrical concave surface oriented away from the source of said radiant energy beam.

4,956,651

IMAGE FORMING APPARATUS WHICH SHEET DETECTION AND TIMING CONTROL

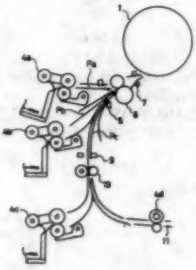
Kiyoshi Emori, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

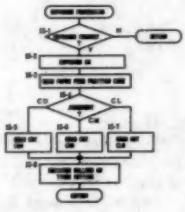
Filed Jun. 30, 1988, Ser. No. 213,821

Claims priority, application Japan, Jul. 1, 1987, 62-165829; Jul. 1, 1987, 62-165830; Aug. 31, 1987, 62-218153

Int. Cl.[5] G01D *15/14*; G03G *15/00*

U.S. Cl. 346—108 **15 Claims**





1. An image forming apparatus which transfers an image formed on a rotating photosensitive drum onto a moving paper sheet at a transfer position, comprising:

a first paper feed means which comprises of a plurality of sheet container sections and feeds paper sheets one by one from one of the sheet container sections selected;

a second paper feed means for feeding a paper sheet transported from the first paper feed means to a transfer position;

a data storing means provided with storage locations corresponding to each sheet container section having a data to decide a timing to actuate the second paper feed means;

a signal emitting means for giving signals to actuate the second paper feed means basing on the data stored in a storage location corresponding to the sheet container section selected;

a sheet detecting means for detecting the leading edge of a paper sheet being transported into a transfer section by the second paper feed means;

a time measuring means for measuring the time required from giving signal to the detecting means detects the leading edge of a paper sheet;

a data change means for changing a data stored in a storage location corresponding to a sheet container section in accordance with the time measured by the time measuring means.

4,956,652

PEN SELECTION MECHANISM FOR A PRINTER

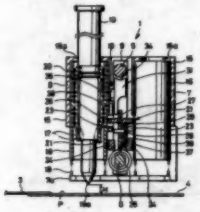
Takashi Onozato, Morioka, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

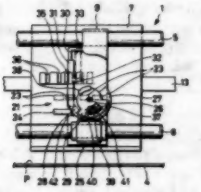
Division of Ser. No. 98,542, Sep. 18, 1987, Pat. No. 4,845,516. This application Mar. 17, 1989, Ser. No. 325,313

Claims priority, application Japan, Dec. 1, 1986, 61-183730; Dec. 1, 1986, 61-183731; Dec. 11, 1986, 61-293496; Dec. 12, 1986, 61-296348

Int. Cl.[5] G01D *9/30*

U.S. Cl. 346—139 R **1 Claim**





1. A pen selection mechanism for a pen type printer, comprising:

a carriage movable in a plane parallel to a surface to be printed;

a plurality of pen chuck mechanisms supported by said carriage, each movable in a direction perpendicular to said surface to be printed together with pens held thereon;

a slider mounted movably with respect to said carriage between a plurality of driving positions corresponding to said pen chuck mechanisms and engaged with said carriage at each of said driving positions;

a pen driving mechanism disposed on said slider and capable of driving at each of the driving positions a corresponding one of said pen chuck mechanisms in the direction perpendicular to said surface;

an engagement mechanism disposed on said slider and capable of engaging said slider with said carriage and disengaging said slider from said carriage; and

a single drive source disposed on said slider for driving both said pen driving mechanism and said engagement mechanism.

4,956,653

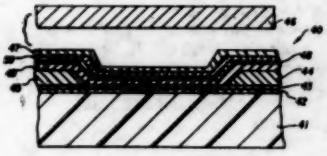
BUBBLE JET PRINT HEAD HAVING IMPROVED MULTI-LAYER PROTECTIVE STRUCTURE FOR HEATER ELEMENTS

Hilarion Braun, Xenia, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1989, Ser. No. 350,867

Int. Cl.[5] B41J *2/05*

U.S. Cl. 346—140 R **11 Claims**



1. In a bubble jet print head device of the kind having a substrate with a plurality of separately addressable resistive heater portions that are formed by address and common electrode pairs that provide electrical energy flow to and away from spaced edges of such heater portions, an improved protective cover construction for such heater portions comprising:

(a) a first layer of dielectric material formed on said heater portions;

(b) shielding meand, including a second layer of metal formed on said first layer and overlying said electrode pairs and said heater portions, for shielding a subsequently overlying layers(s) from localized electrical fields of said electrode pairs; and

(c) a third layer having a physically hard, scratch resistant and chemically inert outer surface portion overlying said first and second layers and said heater portions.

4,956,654

LIQUID INJECTION RECORDING HEAD WITH FLEXIBLE SUPPORT

Hirokazu Komuro, Hiratsuka; Hiroto Matsuda, Ebina; Hiroto Takahashi; Makoto Shibata, both of Hiratsuka; Masami Ikeda, Machida, and Hisanori Tsuda, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 41,629, Apr. 22, 1987, abandoned, which is a continuation of Ser. No. 694,063, Jan. 23, 1985, abandoned. This application Oct. 25, 1988, Ser. No. 262,120

Claims priority, application Japan, Jan. 31, 1984, 59-14519

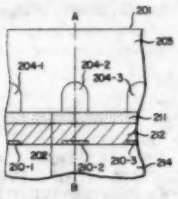
Int. Cl.[5] G01D *15/16*; B41J *2/04*

U.S. Cl. 346—140 R **41 Claims**

1. A liquid jet recording head having a discharge port for discharging liquid, the recording head comprising:

a flexible support member, formed of an organic resin, including an energy generating member for generating energy utilized to discharge liquid through the discharge port, said energy generating member having a heat gener-

ating resistive layer and a pair of electrodes connected to said heat generating resistive layer; and



a member bonded to said support member to form a liquid path communicating with the discharge port.

4,956,655

PROJECTING APPARATUS

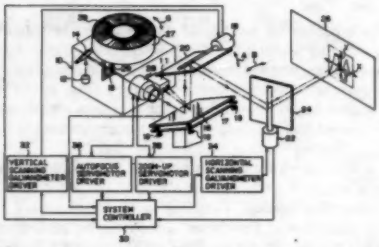
Akiro Wakebe, Tokyo, Japan, assignor to Kabushiki Kaisha System Ray, Tokyo, Japan

Continuation-in-part of Ser. No. 21,972, Mar. 5, 1987. This application Nov. 14, 1988, Ser. No. 271,059

Claims priority, application Japan, Nov. 17, 1987, 62-174285[U]

Int. Cl.[5] G03B *3/10*

U.S. Cl. 353—101 **11 Claims**



1. A projecting apparatus comprising:

a projector for projecting an image;

a first rotary mirror, a first rotary shaft for rotating said first rotary mirror, said first rotary shaft being arranged at a predetermined angle, to position the first mirror to reflect said image projected by said projector;

a first driving means for rotating said first shaft of said first rotary mirror;

a second rotary mirror, a second rotary shaft for rotating said second rotary mirror, said second rotary shaft being positioned at a predetermined angle in conjunction with said first rotary shaft of said first rotary mirror and being arranged to reflect said image reflected by said first rotary mirror toward a projection screen;

a second driving means for rotating said second shaft of said second rotary mirror;

control means for controlling said first and second driving means to effect angular rotation of said first and second rotary mirrors;

a sensor means for measuring an optical path length between said projector and said image on said projection screen by emitting and receiving a light beam along the optical path to said projection screen to control the focus of said projector through said control means in accordance with variation of said optical path length to said image on the projection screen, said optical path being defined by the projector, the first and second mirrors and the projection screen; and

said projector having an autofocus mechanism responsive to the sensor means for effecting automatic focusing of said projector so that said image projected onto said projection screen is maintained in focus.

4,956,656

CONTROL DEVICE FOR USE IN A CAMERA HAVING A CONSECUTIVE PICTURE TAKING MODE AND A SINGLE PICTURE TAKING MODE

Kouji Yamamoto, Sakai; Akira Yamanaka, Sakai; Nobuyuki Taniguchi, Tondabayashi; all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

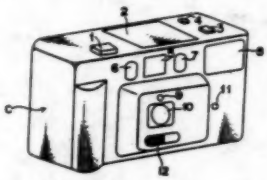
Continuation of Ser. No. 169,586, Mar. 17, 1988, Pat. No. 4,814,318, which is a division of Ser. No. 797,510, Nov. 13, 1985, abandoned. This application Mar. 8, 1989, Ser. No. 320,620

Claims priority, application Japan, Nov. 14, 1984, 59-173261; Dec. 28, 1984, 59-197143; Feb. 27, 1985, 60-28848; Mar. 8, 1985, 60-33950; Mar. 12, 1985, 60-35962; Mar. 12, 1985, 60-35963; Mar. 27, 1985, 60-45490; Mar. 27, 1985, 60-45491; Mar. 28, 1985, 60-46676; Mar. 28, 1985, 60-46677; Mar. 28, 1985, 60-46678

The portion of the term of this patent subsequent to Jan. 20, 2006, has been disclaimed.

Int. Cl.[5] G03B *1/00*

U.S. Cl. 354—173.1 **1 Claim**



1. A control device for use in a camera comprising:

means for selecting a first mode in which the camera operates to take pictures consecutively, and a second mode in which the camera operates to take only one picture;

means for preliminary winding-up a film by predetermined length in response to a closure of a back lid of the camera, the film lying in the normal frame position when the preliminary winding is terminated; and

means for forcibly selecting the second mode before the preliminary winding is terminated.

4,956,657

PHOTOGRAPHIC CAMERA

Dai Shintani; Toshihiko Taniguchi; Yukio Miki; Katsuhito Akagi, and Hideo Kajita, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 16, 1989, Ser. No. 352,262

Claims priority, application Japan, May 16, 1988, 63-119849

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—195.12 **10 Claims**

1. A photographic camera comprising:

a lens movable along an optical axis;

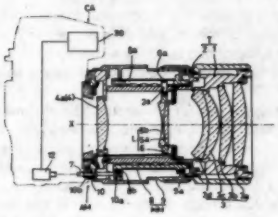
a manual lens moving mechanism for manually moving said lens;

a drive device;

an automatic lens moving mechanism for automatically moving said lens using a drive of said drive device and including a clutch provided between said drive device and said lens;

urging means for urging said clutch towards an engaged state;

locking means for locking said clutch in a disengaged state against the urging force of said urging means; and



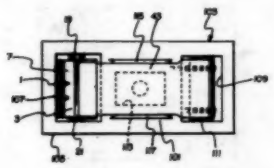
releasing means for releasing said locking means through operation of the drive of said drive device.

4,956,658

FILM THREADING APPARATUS

David C. Smart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 14, 1989, Ser. No. 379,752
Int. Cl.[5] G03B *17/28, 17/30*
U.S. Cl. 354—212 2 Claims



1. An improved photographic camera wherein a film threading path leads from a receiving chamber for a film cassette including a film spool rotatable to unwind a filmstrip off the spool to automatically thrust a non-protruding relatively wider leader portion of the filmstrip out of the cassette to enable the leader portion to be propelled along said film threading path, and wherein the improvement to said camera comprises:

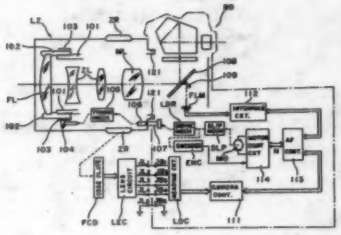
a pair of elongate film guide members fixed lengthwise along opposite sides of the film threading path, aid fixed guide members being spaced apart a predetermined distance measured across the film threading path which is slightly less than the width of the leader portion and slightly greater than the width of the substantial remainder of the filmstrip to bow the leader portion across its width, but not the remainder of the filmstrip, to thereby significantly increase the longitudinal stiffness of the leader portion to facilitate its being propelled along the film threading path responsive to unwinding rotation of the film spool.

4,956,659

AUTOMATIC FOCUS ADJUSTING APPARATUS

Masataka Hamada; Tokuji Ishida, both of Osaka, and Yasuaki Adaka, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 368,248, Jun. 19, 1989, abandoned, which is a division of Ser. No. 186,882, Apr. 27, 1988, Pat. No. 4,888,609, which is a continuation of Ser. No. 819,865, Jan. 16, 1986, abandoned. This application Dec. 15, 1989, Ser. No. 455,825
Claims priority, application Japan, Jan. 14, 1985, 60-11250; Jan. 17, 1985, 60-7179
Int. Cl.[5] G03B *13/36*
U.S. Cl. 354—400 5 Claims



1. A camera having an automatic focus adjusting apparatus for adjusting automatically a focus condition of an objective lens comprising:

defocus detecting means for detecting a defocus amount and defocus direction of said objective lens;

signal generating means for generating a defocus signal representing the detected defocus amount and defocus direction, and for generating a brake signal when it is detected that the objective lens has moved to an infocus condition;

objective lens driving means for controlling the driving direction and driving amount based on said defocus signal and brake signal;

exposure starting means for producing an exposure start signal which starts an exposure operation of said camera; and

control means for inhibiting the generation of said brake signal from said signal generating means, in the case when said exposure start signal is generated during the movement of said objective lens by said driving means.

4,956,660

FOCUS DETECTING APPARATUS FOR CAMERA

Yoshiharu Takahashi, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 215,855, Jul. 6, 1988, abandoned. This application Dec. 28, 1989, Ser. No. 456,620
Claims priority, application Japan, Jul. 7, 1987, 62-167716; Jul. 7, 1987, 62-167717
Int. Cl.[5] G03B *13/36*
U.S. Cl. 354—402 7 Claims

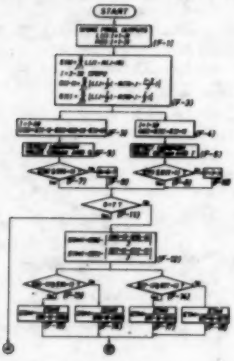
1. A focus detecting apparatus for a camera, comprising:

first and second light-receiving means for receiving first and second images formed by a light bundle received from an object to be photographed through first and second portions of a photographing lens and for outputting image signals corresponding to light distribution patterns of said first and second images; and

correlation detecting means for detecting the portions of said first and second images representing the highest correlation degree of said first and second images in accordance with the image signals defined in pixel increments to thereby determine the focus position of said photo-

graphing lens by detecting the portion having the highest correlation degree using at least one of the following methods (1) and (2):

(1) defining said image signals in pixel increments, determining the difference between said image signals in pixel outputs by shifting receiving means and calculating com-



parison data by adding the sum of said differences between said image signals to determine the portion of said first and second images producing the maximum comparison data change ratio and (2) detecting the portion of said first and second images producing the minimum comparison data, the correlation detecting means selecting a result of one of the methods (1) and (2) having higher reliability.

4,956,661

CAMERA SYSTEM

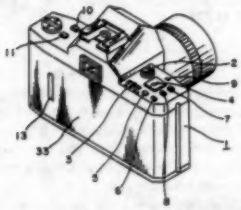
Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Osaka; Takeo Hoda, Sakai; Masaaki Nakai, Nara; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 43,758, Apr. 29, 1987, Pat. No. 4,763,144, which is a division of Ser. No. 888,600, Jul. 23, 1986, Pat. No. 4,712,904, which is a division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914. This application Jul. 15, 1988, Ser. No. 220,063

Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-139600; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453

Int. Cl.[5] G03B *7/20, 15/05, 17/18*

U.S. Cl. 354—412 **8 Claims**



1. A camera system having a camera body and at least one camera necessary attachable to the camera body, comprising:

a plurality of circuit elements provided in the camera body and in said at least one camera accessory for performing predetermined respective operations;

means provided in the camera body for controlling the plurality of circuit elements, including:

a data bus for connecting the control means with the plurality of circuit elements, said data bus serially sending data from the control means to the plurality of circuit elements and from the plurality of circuit elements to the control means;

at least one signal line for connecting the control means with each of said circuit elements, respectively, for sending clock pulses utilized for synchronizing the data sent through the data bus; and

a plurality of selecting lines for selecting, by the control means, which circuit element receives the data from the control means and sends the data to the control means; and

said control means selecting, in accordance with predetermined camera operation, the circuit element which operates through said selecting lines, said control means receiving data from the selected circuit element through the data bus with pulses through the signal line to calculate data sent to the circuit element according to the predetermined camera operation, and said control means sending the calculated data to the selected circuit element through the data bus with pulses through the signal line for operating said circuit element.

4,956,662

APPARATUS FOR AND METHOD OF RECORDING COLOR PICTURE IMAGE

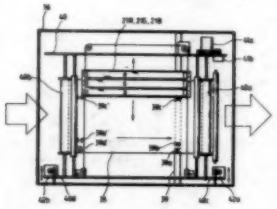
Toshio Sakai; Osamu Kawano; Kazunori Tanabe, and Tomoaki Hattori, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 11, 1988, Ser. No. 255,342

Claims priority, application Japan, Oct. 9, 1987, 62-256000; Mar. 10, 1988, 63-32109[U]; Mar. 16, 1988, 63-62810; Apr. 22, 1988, 63-100913

Int. Cl.[5] G03B *27/32*

U.S. Cl. 355—27 **21 Claims**



1. A color picture image recording apparatus for forming a color picture image on a photosensitive recording medium by exposing the photosensitive recording medium to light through each of a plurality of masking master plates produced according to original color picture image information, each of the masking master plates having a location mark, said apparatus comprising:

(a) a housing;

(b) a conveyor belt disposed in said housing and defining a flat surface for carrying thereon one of the masking master plates at a time, said flat surface having a downstream end and an upstream end;

(c) a belt support unit mounted in said housing and supporting said conveyor belt, said belt support unit being movable relative to said housing and having a pair of downstream and upstream portions;

(d) first drive means for moving said conveyor belt in a longitudinal direction;

(e) second and third drive means operatively connected to

said belt support unit at said downstream and upstream portions, respectively, each of said second and third drive means being independently operable for moving a respective one of said downstream and upstream portions in a plane parallel to said flat surface of said conveyor belt and in a transverse direction substantially perpendicular to said longitudinal direction;

(f) a plurality of sensors disposed above said flat surface of said conveyor belt for reading out said location mark on the individual masking master plate carried on said flat surface of said conveyor belt and for issuing respective output signals; and

(g) control means for controlling said first, second and third drive means according to the output signals issued from said sensors.

4,956,663

DEVICE FOR PRINTING PHOTOGRAPHS

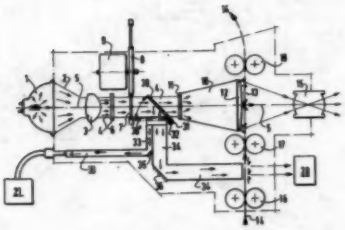
Franck Gerstch, Meylan, France, assignor to Kis Photo Industrie, Grenoble, France

Filed Aug. 11, 1989, Ser. No. 392,778

Claims priority, application France, Aug. 18, 1988, 88 11137

Int. Cl.[5] G03B *27/80*

U.S. Cl. 355—38 **11 Claims**



1. Apparatus for printing photographic negatives that include

a light source,

projecting means for directing light from the source along an optical path,

an exposure means mounted in the optical path for illuminating a film to be printed and projecting an image thereof onto an exposure plane for printing,

color filter means positioned in said optical path between the light source and the exposure means for filtering said light,

film transport means for passing a film to be printed sequentially through a color analysis means and then said exposure means,

a reflecting means movably mounted adjacent to the optical path between the filter means and the exposure means,

positioning means to selectively place the reflecting means in a first position within said optical path to direct filtered light to said color analysis means wherein the color content of a film is analyzed and a second position outside of said optical path to permit filtered light to illuminate a film in said exposure means wherein the image carried on said film is projected onto said exposure plane.

4,956,664

IMAGE PROCESSING APPARATUS HAVING AN OVERHEAD PROJECTOR

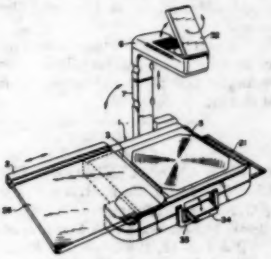
Takanori Hasegawa, Hachioji; Nobuyuki Abe, Toride; Toshihiko Hirose, Yamanashi; Takashi Kanda, Kofu; Hiroshi Saito, Yamanashi; Eiji Nakazawa, Niiasaki, and Masaki Oshima, Yamanashi, all of Japan, assignors to Riso Kagaku Corporation, Tokyo and Nippon Seimitsu Kogyo Kabushiki Kaisha, Kof, both of, Japan

Filed May 15, 1989, Ser. No. 351,742

Claims priority, application Japan, May 17, 1988, 63-120172; May 17, 1988, 63-120173; May 17, 1988, 63-120174; May 17, 1988, 63-120175; May 17, 1988, 63-120176; May 17, 1988, 63-120177

Int. Cl.[5] G03B *27/52*

U.S. Cl. 355—43 **14 Claims**



1. An image processing apparatus comprising:

(a) an input unit for inputting an image of an initial original;

(b) a support table on which the initial original is to be set, said support table being movably mounted along said input unit;

(c) a reflection-type focusing plate on which a projecting sheet is to be set, said reflection type focusing plate being disposed alongside said input unit;

(d) an image forming unit disposed under said reflection-type focusing plate for forming on a sheet an image inputted from said input unit; and

(e) a projecting unit disposed above said reflection-type focusing plate for projecting an image of the projecting sheet set on said reflection-type focusing plate.

4,956,665

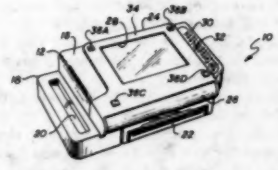
FRAMING APPARATUS FOR A MEDICAL SCANNING CAMERA

Thomas J. Niles, Tewksbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jul. 3, 1989, Ser. No. 375,191

Int. Cl.[5] G03B *27/48, 27/50*

U.S. Cl. 355—50 **8 Claims**



1. Photograhic apparatus for precisely selecting copying a portion of an illuminated image, comprising:

a housing having an opening therein for the passage of image-carrying light therethrough;

means for locating photosensitive material at a plane within said housing;

image-transferring means mounted within said housing in a lighttight relation with respect to said housing opening, said image transferring means being actuatable for transferring image-carrying light entering said housing opening to said plane;

a frame member having an opening therein for precise placement over a selected portion of said illuminated image;

means for coupling said frame member to said housing such that said housing may be moved between a framing position where said frame member is placed over the selected illuminated image portion and where it does not block a camera operator's view of said selected image portion, and an exposure position where the housing opening is in registration with the frame opening in preparation for photographically copying said selected illuminated image portion; and

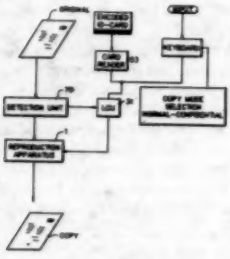
means for actuating said image-transferring means to thereby transfer image-carrying light entering said housing opening to said plane and to photosensitive material located thereat.

4,956,666

SECURE COPIER AND METHOD OF REPRODUCTION

James D. Allen, Greece; Calvin E. Harris, Fairport; Debora M. Litwiller, Greece, and Matthew J. Russel, Mendon, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 13, 1989, Ser. No. 365,327
Int. Cl.[5] G03G 21/00
U.S. Cl. 355—201 10 Claims



1. A reproduction apparatus for controlling reproduction of confidential documents, the apparatus comprising:

a transparent platen for supporting a document for exposure;

means for illuminating the document so that light reflected therefrom is imaged and passes through said platen along an exposure path;

a photoconductive means located along said exposure path for forming an image of the document;

means for electrostatically charging the photoconductive material;

means for developing the image to form a reproduction, the developing means including means for developing an electrostatic image of the document with a transferable toner and for transferring the toner to a receiver sheet to form the reproduction;

a transparent coil located in the exposure path of light reflected from the document;

means for energizing the coil with a varying electrical signal;

means responsive to a signal from the coil for detecting the presence of a substance in the document affecting the magnetic field of the coil for determining whether or not the document is a confidential document; and

wherein the developing means further includes two development stations and means for selectively developing the reproduction of the confidential document with a first toner containing metal and for selectively developing the reproduction of the non-confidential document with a second toner that does not contain metal;

means for enabling the reproduction of the document with the second toner if it is not identified as a confidential document and for enabling reproduction of the document with the first toner if it is identified as a confidential document; and

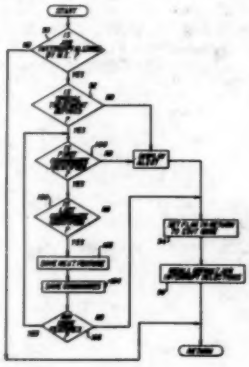
operator identification means for enabling reproduction of confidential documents only with meeting of an authorization criterion.

4,956,667

PRIORITY INTERRUPT DURING EDITING MODE

Margaret C. Gartner, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 23, 1989, Ser. No. 371,238
Int. Cl.[5] G03G 21/00
U.S. Cl. 355—202 4 Claims



1. A document copier having a copier operation that includes image editing and image forming, said copier comprising:

image editing means for inputting data of a production run, which data both (1) specifies special features and (2) defines areas of an original document for treatment by said special features;

image forming means, operable in accordance with said image editing means, for carrying out the special features in the defined areas of a production run;

interrupt means for interrupting the image editing means and the image forming means so that a job of higher priority can be processed;

means, operable upon interruption of copier operation, for storing said special features specifying data and said area defining data of a production run, said storing means being operable to store said specifying and defining data only for areas which are completely defined at the time of interrupt of the copier operation; and

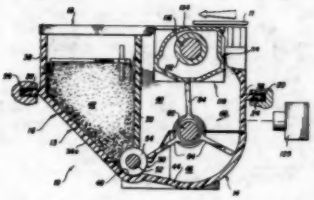
means for resuming the copier operation for the interrupted production run after termination of the interruption by said interrupting means.

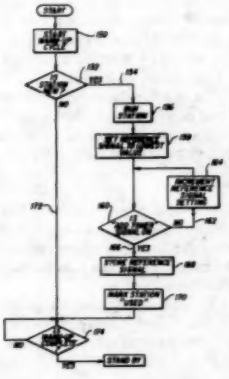
4,956,668

DEVELOPER MIX MONITORING FOR REPLACEABLE DEVELOPER STATIONS

Kenneth A. Arnold; Wunan Chang, both of Rochester, and Kelly S. Robinson, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,967
Int. Cl.[5] G03G 15/08
U.S. Cl. 355—208 13 Claims





1. An electrostatographic machine comprising:

means for receiving replaceable development stations of the type having (1) a chamber containing a developer mix of carrier particles and toner powder in a predetermined desired concentration and (2) means for indicating whether the developer mix in the development station is fresh;

means for producing a signal representative of the concentration of toner powder in the developer mix in the chamber;

means for setting a reference signal;

means for sensing the indicating means of a received development station for determining if the development mix therein is fresh; and

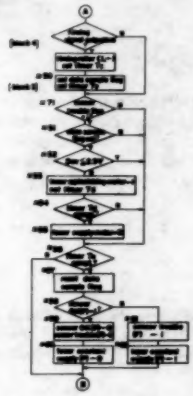
means, operable only upon determining that the developer mix in the received development is fresh, for adjusting the reference signal until it substantially equals the toner concentration signal.

4,956,669

CONTROL APPARATUS FOR CONTROLLING DENSITY OF TONER IN A DEVELOPING UNIT

Minoru Nakamura, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 11, 1989, Ser. No. 336,064
Claims priority, application Japan, Apr. 13, 1988, 63-90744
Int. Cl.[5] G03G 21/00
U.S. Cl. 355—208 11 Claims



1. A control apparatus for controlling a concentration of toner incorporated in developing a material in a developing unit, comprising:

a toner concentration detecting sensor, provided in the developing unit, for detecting said toner concentration;

abnormality discriminating means for discriminating an abnormal state in which said detecting sensor is incapable of detecting an accurate toner concentration, and for outputting an abnormal signal indicating the abnormal state;

toner replenishing means for replenishing toner to the developing unit; and

control means for controlling said toner replenishing means to replenish the toner in accordance with the toner concentration detected by said toner concentration detecting sensor in a first state wherein said abnormality discriminating means does not output the abnormal signal, and to replenish the toner by a constant volume at a predetermined period in a second state wherein said abnormality discriminating means outputs the abnormal signal.

4,956,670

ELECTROSTATIC LATENT IMAGE FORMING APPARATUS CONTROLLING THE DIRECTION OF DERIVATION OF IONS

Koji Masuda; Yuji Suemitsu, and Kazuo Asano, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Aug. 2, 1989, Ser. No. 388,388
Claims priority, application Japan, Aug. 4, 1988, 63-193595
Int. Cl.[5] G03G 15/00, 15/02
U.S. Cl. 355—210 8 Claims

1. An electrostatic latent image forming apparatus comprising:

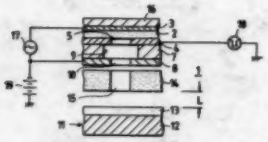
first, second and third electrodes;

first and second insulating substrates, and

an insulating member;

wherein said first and second electrodes are provided with said first insulating substrate interposed therebetween said first and second electrodes, said second electrode having a space area for producing creeping corona discharge in

response to a voltage being applied between said first and second electrodes, said third electrode being provided with said second insulating substrate disposed between said second and third electrodes, said third electrode



having an ion derivation area for deriving ions produced by said creeping corona discharge, said insulating member being provided on the ion derivation side of said third electrode and having a control area for controlling the direction of the derivation of ions.

4,956,671

WIRE CLEANING DEVICE FOR A CORONA DISCHARGE TYPE CHARGER

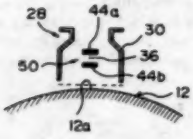
Hirohisa Otsuka, Kawaguchi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,361

Claims priority, application Japan, Oct. 29, 1987, 62-271769

Int. Cl.[5] G03G *21/00, 15/02*

U.S. Cl. 355—215 **4 Claims**



1. In a device for cleaning a wire of a charger having a shield case formed with an opening which faces a surface of a photoconductive element of an image recording apparatus to be charged and extends over substantially an entire length of the surface of said photoconductive element, and a wire extending within and in a lengthwise direction of said shield case, wherein the improvement comprises:

movable cleaning members movable into and out of contact with a portion of said wire which faces the surface of said photoconductive element and a portion which is diametrically opposite to said first-mentioned portion, respectively, and movable relative to said wire;

rotable support means for slidably engaging said cleaning members with said wire when said movable cleaning members are moved in one direction relative to said wire; and

means for spacing apart said cleaning members from said wire when said movable cleaning members are moved in the other direction relative to said wire.

4,956,672

COPYING MAGNIFICATION SETTING DEVICE FOR AN ELECTROPHOTOGRAPHIC COPYING APPARATUS

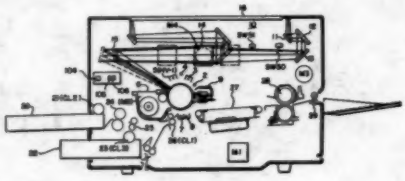
Kenji Shibazaki, Aichi; Yutaka Irie, Toyokawa; Masazumi Ito, Toyokawa, and Tomoji Murata, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 932,777, Nov. 19, 1986, Pat. No. 4,827,310, which is a division of Ser. No. 762,122, Aug. 2, 1985, Pat. No. 4,644,499, which is a division of Ser. No. 498,885, May 27, 1983, Pat. No. 4,543,643. This application Sep. 16, 1988, Ser. No. 246,499

Claims priority, application Japan, May 28, 1982, 57-91877; Nov. 25, 1982, 57-206444; Nov. 29, 1982, 57-209845; Feb. 10, 1983, 58-20833; Mar. 8, 1983, 58-38743

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—243 **5 Claims**



1. A copying machine comprising:

means for forming an image of an original to be copied on copying paper;

a plurality of copy magnification selection keys each of which is assigned to a predetermined numerical value;

first display means having a plurality of display elements each of which corresponds to each of the copy magnification selection keys and is enabled when a corresponding copy magnification key is operated;

second display means for displaying numeric values when any one of said copy magnification selection keys is operated to as to display the numeric value corresponding to the operated copy magnification selection key;

an up key;

a down key;

means, operatively connected to said up key and said down key, for varying the numeric value in such a manner that the contents of the display is either increased or decreased by a predetermined value in response to the operation of said up key or down key;

control means for controlling said image forming means so that the numeric value displayed on the second display means corresponds to the ratio of the size of the image of the original and the size of the image of the copy paper, and

display control means for disabling the operation of said first display means when the numeric value displayed on said second display means is varied by said numeric value varying means.

4,956,673

IMAGE FORMING APPARATUS WITH EASILY REMOVABLE DEVELOPING UNITS

Yasuo Abuyama, Ebina; Fumito Ide, Zama; Osamu Hamanaka, Yokohama, and Takeshi Sasbayashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 29,354, Mar. 23, 1987, Pat. No. 4,814,823, which is a continuation of Ser. No. 727,859, Apr. 26, 1985, abandoned. This application Sep. 12, 1988, Ser. No. 243,481

Claims priority, application Japan, Apr. 27, 1984, 59-85650

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—245 **10 Claims**

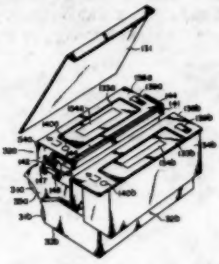
1. An image-forming apparatus, comprising:

a housing;

an image carrier disposed in the housing and adapted to carry thereon a latent image correspnding to an original image;

a developing device for developing the latent image formed on the surface of the image carrier, said developing device including first developing means for developing the latent image by means of a first developing agent, and second developing means for developing the latent image by means of a second developing agent, at least one of said first and second developing means being removably set in said housing and being exchangeable;

inserting/removing means for inserting at least one of said first and second developing means in the housing or removing it from the housing; and



selecting means for selecting the first or second developing means that is to be operated,

said inserting/removing means including:

a handle; and

first and second hooks arranged to rotate about respective first and second supporting shafts at the outer two ends of said handle, said first and second hooks being provided for engaging with first and second pins on said housing for securing at least one of the first and second developing means to said housing when said handle is moved to a first-position, said first and second hooks disengaging from the first and second pins when said handle is moved to a second position.

4,956,674

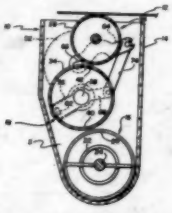
METERING ASSEMBLY FOR DEVELOPMENT APPARATUS

Satyan K. Kalyandurg, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 29, 1989, Ser. No. 400,191

Int. Cl.[5] **G03G** *15/09*

U.S. Cl. 355—251 **3 Claims**



1. Apparatus for applying developer material to a latent electrostatic image; said apparatus comprising:

a housing having a sump for containing a supply of developer material;

a magnetic brush in said housing and spaced from said sump;

a feed mechanism between said sump and said magnetic brush, said feed mechanism including (1) rotary means for receiving developer material from said sump and for delivering such material to said magnetic brush and (2) a drive mechanism axially aligned with and drivingly engaged with said rotary means;

metering means between said sump and said magnetic brush, said metering means being mounted in said housing for rotation, about an axis substantially co-axial with said rotary means for movement between (1) an open position communicating the magnetic brush and the sump and (2) a closed position substantially isolating the magnetic brush from the sump;

drive means outside said housing and spaced from said metering means, said drive mechanism being positioned axially between said drive means and said metering means;

means for drivingly connecting said metering means to said drive means while at the same time avoiding interference with said drive mechanism, said connecting means extending radially outwardly around said drive mechanism.

4,956,675

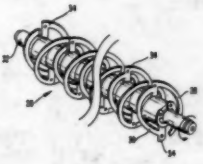
RIBBON BLENDER FOR A DEVELOPMENT APPARATUS WITH SELF ADJUSTING INNER AND OUTER RIBBONS

Brian J. Joseph, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,147

Int. Cl.[5] **G03G** *15/09*

U.S. Cl. 355—251 **7 Claims**



1. In an electrostatographic developer material mixing apparatus including a ribbon blender having:

a drive member;

a first flexible helical ribbon drivingly connected at one of its ends to the drive member for moving developer material along the length of the ribbon in a first direction;

a second flexible helical ribbon drivingly connected at one of its ends to the drive member for moving developer material along the length of the second ribbon in a direction opposite to said first direction;

the improvement wherein the end of each ribbon toward which developer material is moved is not connected to the drive member and is free to flex under load to change its pitch angle, whereby the rate of developer movement is reduced as developer material builds up at the ribbon ends.

4,956,676

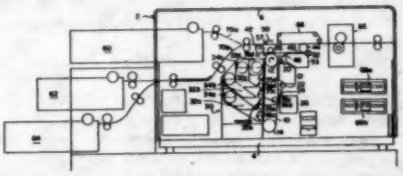
ELECTROGRAPHIC COLOR PRINTER/COPIER

Kensuke Fukae, Monsey, N.Y., and Koichi Kinoshita, Shizuka, Japan, assignors to Kentek Information Systems, Inc., Allendale, N.J.

Continuation-in-part of Ser. No. 39,523, Apr. 16, 1987, abandoned. This application May 12, 1987, Ser. No. 49,715

Int. Cl.[5] **G03G** *15/16, 15/01*

U.S. Cl. 355—271 **32 Claims**



18. An electrographic color printing apparatus for imprinting information in color on a sheet of paper or the like, comprising

a housing,

a source of paper and an output for said paper after it is imprinted,

a paper path along which said paper travels within said printing apparatus,

a photoconductive member for storing a latent electrostatic image of information to be imprinted,

developer means containing toners of multiple colors for developing said electrostatic image in multiple colors,

a transfer belt cooperating with said photoconductive member for receiving said developed cclor image from said photoconductive member and for transferring said developed color image to said paper,

wherein said photoconductive member comprises a vertically aligned photoconductive belt, and said transfer belt is located above said photoconductive belt.

4,956,677

CLEANING DEVICE FOR IMAGE FORMING APPARATUS

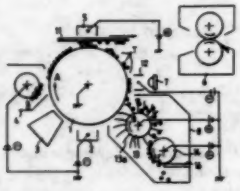
Keiichi Akiyama, Iwate, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 9, 1989, Ser. No. 308,858

Claims priority, application Japan, Feb. 29, 1988, 63-46100

Int. Cl.[5] G03G *15/00, 15/08, 21/00*

U.S. Cl. 355—303 **6 Claims**



1. A cleaning system for an image forming apparatus of the type wherein an electrostatic latent image on an image carrier is developed with colored fine particles, and the colored fine particles of the developed image are transferred to a transfer medium, said cleaning system being provided to remove colored fine particles remaining on said image carrier after transfer of the developed image to said transfer medium, said cleaning system comprising a conductive cleaning brush for slidably contacting with said image carrier to remove colored fine particles remaining on said image carrier, a first voltage applying means coupled to said cleaning brush for applying a first bias voltage to said conductive cleaning brush of the polarity opposite to the polarity of the charge of the colored fine particles, a precharging means for charging said colored fine particles remaining on said image carrier to a polarity opposite to the polarity of said cleaning brush, whereby colored fine particles remaining on said image carrier are removed by said conductive cleaning brush, and light irradiating means for removing residual charges from the image carrier after the transfer, said light irradiating means and said precharging means being arranged such that they affect charging and light irradiation on the same portion of the image carrier, whereby said precharging means uniformalize the polarity of said colored fine particles remaining on the image carrier and, simultaneously, said light irradiating means removes residual charges on said image carrier, followed by cleaning by said cleaning brush.

4,956,678

RECORDING SHEET TRANSPORT APPARATUS

Yukitoshi Kiya, Kawasaki, and Yasushi Nakazato, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 388,341

Claims priority, application Japan, Aug. 18, 1988, 63-204999; Aug. 25, 1988, 63-210958; Dec. 20, 1988, 63-321658; May 19, 1989, 1-126865

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—318 **15 Claims**

1. A recording sheet transport apparatus of a duplex image forming apparatus which has an image forming part, at least one paper supplying unit and an eject part, said recording sheet transport apparatus comprising:

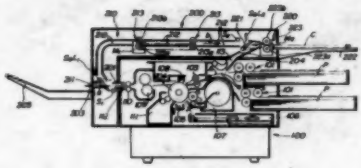
a transport path for supplying a recording sheet which is received from the paper supplying unit to the image forming part;

first transport means for transporting the recording sheet in said transport path;

a reversing path for reversing side of the recording sheet;

second transport means for transporting the recording sheet in said reversing path;

a first path selector having a first position for guiding the recording sheet from the image forming part to said reversing path and a second position for guiding the recording sheet from the image forming part to the eject part;



refeeding means for refeeding the recording sheet in said reversing path to said transport path;

driving means for driving said first and second transport means; and

control means for controlling said first path selector to one of said first and second positions and for controlling driving timings of said first and second transport means,

said driving means comprising a first driving source and a second driving source for independently driving said first and second transport means.

4,956,679

IMAGE FORMING APPARATUS

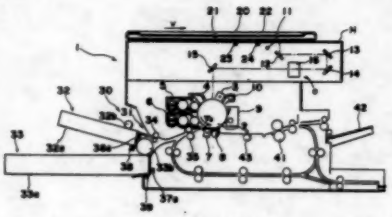
Yoshiaki Takano, and Norihiko Suzuki, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

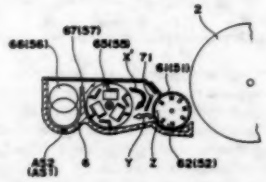
Filed Apr. 22, 1988, Ser. No. 185,164

Claims priority, application Japan, Apr. 25, 1987, 62-102934; Apr. 25, 1987, 62-102935; Apr. 25, 1987, 62-102936; Apr. 25, 1987, 62-102937

Int. Cl.[5] G03G *15/01*

U.S. Cl. 355—326 **8 Claims**





1. An image forming apparatus comprising:

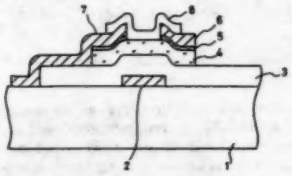
a rotatable support member;
means for forming an electrostatic latent image on said support member;
a first developing means for developing said electrostatic latent image by use of a first developer, said first developing means being so provided as to confront said support member;
a second developing means including a developing roller for developing said electrostatic latent image and a supply means for supplying to the surface of the developing roller a second developer which has a color different from that of the first developer, said second developing means being provided at a downstream side of said first developing means in a rotational direction of said support member;
a first preventing means for preventing a developing operation of said first developing means;
a second preventing means for preventing a developing operation of said second developing means, said second preventing means including a shut-off means for shutting off supply by said supply means of the second developer to said developer roller and a driving means for changing over said shut-off means from a first state for shutting off supply of the second developer from said supply means to said developing roller to a second state enabling supply of the second developer from said supply means to said developing roller;
a region designating means for designating, in the electrostatic latent image, first and second regions to be developed by the first and second developers, respectively;
a control means for changing over the operation from the first developing means to the second developing means in response to a signal from said region designating means, said control means actuating, in a condition of rotating the developing roller, said driving means so that the second developer supplied to the developing roller is in contact with the electrostatic latent image on the support member after a trailing end of a visible image of the first developer on the support member has passed a position of the developing roller;
a driving source for driving said first developing means or said second developing means; and
a changeover means for performing changeover between transmission of a driving force of said driving source to said first developing means and that to said second developing means, said shut-off means stopping shut-off of supply of the second developer to said developing roller upon lapse of a predetermined time period after the driving force of said driving source has been changed over from said first developing means to said second developing means.

4,956,680

THIN FILM TRANSISTOR

Hideo Tanaka, and Shunichi Motte, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Filed Dec. 14, 1987, Ser. No. 132,406
Claims priority, application Japan, Dec. 22, 1986, 61-305708
Int. Cl.[5] H01L 27/12
U.S. Cl. 357—4 **10 Claims**



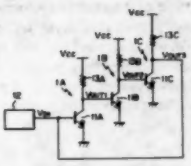
1. A thin film transistor comprising: an insulating substrate, a gate electrode disposed on the insulating substrate, a gate insulating film disposed on the gate electrode and the insulating substrate, an amorphous semiconductor film disposed on the gate insulating film, a source electrode and a drain electrode disposed in spaced relation to each other on the amorphous semiconductor film, and a light-shielding film disposed on the source electrode, the drain electrode and the amorphous semiconductor film for reducing optical leakage current, the light-shielding film being composed essentially of photoresist material containing black carbon.

4,956,681

TERNARY LOGIC CIRCUIT USING RESONANT-TUNNELING TRANSISTORS

Naoki Yokoyama, Atsugi, and Masao Taguchi, Sagamihara, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 917,060, Oct. 9, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 310,463
Claims priority, application Japan, Oct. 9, 1985, 60-223690
Int. Cl.[5] H01L 27/12, 45/00, 49/02
U.S. Cl. 357—4 **15 Claims**



1. A logic circuit operatively connected to receive a pulse signal, comprising:
at least three resonant-tunneling transistors connected in series to form a closed loop, each said resonant-tunneling transistor having an emitter, a base, a superlattice formed between the emitter and the base and having a quantum well having at least one resonant energy level, and a collector, and having a negative resistance characteristic of a negative transfer conductance, each resonant-tunneling transistor conducting a current between the collector and the emitter, the current having one of at least three different current values including a first, a second or a third value, defined by said negative resistance characteristic and in response to a base voltage having one of three different voltage values including a first, a second or a third value, said third current value being between said first and second current values, and said second voltage value being between said first and third voltage values,
said logic circuit holding at least three states, each state being, respectively, a high value, a low value, and a value approximately between said high and low values of said three resonant-tunneling transistors in response to the pulse signal applied to the base of one of said three resonant-tunneling transistors, the pulse signals having an amplitude of one of said first to third voltage values.

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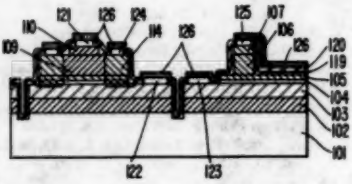
OPTOELECTRONIC INTEGRATED CIRCUIT

Kiyoshi Ohnaka, Moriguchi; Hiraaki Tsujii, Nara; Yoichi Sasai, Hirakata, and Jun Shibata, Kawachinagano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 10, 1988, Ser. No. 154,214
Claims priority, application Japan, Apr. 28, 1987, 62-105140; May 29, 1987, 62-135079
Int. Cl.[5] H01L 27/02
U.S. Cl. 357—16 **1 Claim**

1. An optoelectronic integrated circuit comprising:
a laser device including a first cladding layer of a first type of conductivity formed on a semi-insulating substrate, an

active layer formed on said first cladding layer of said first type of conductivity, a waveguide layer of a second type of conductivity formed on said active layer being wider in band gap than said active layer, and a second cladding layer of said second type of conductivity formed partially on the surface of said waveguide layer of said second type of conductivity being wider in band gap than said waveguide layer; and



a heterojunction bipolar transistor including an emitter layer of said first type of conductivity formed partially on the surface of said waveguide layer of said second type of conductivity being wider in band gap than said waveguide layer, a collector formed by a portion of said first cladding layer of said first type of conductivity and a base formed by a portion of said waveguide layer of said second type of conductivity.

4,956,683

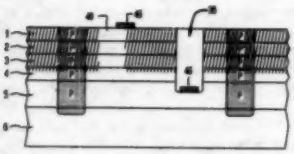
ISOLATION OF P-N JUNCTIONS

Victor E. Quintana, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 14, 1988, Ser. No. 167,780

Int. Cl.[5] H01L *33/00*

U.S. Cl. 357—17 **14 Claims**



1. A semiconductor structure including means for isolating discrete portions thereof comprises:

semi-insulating substrate;

a plurality of stacked layers overlying each other with the innermost layer thereof overlying said semi-insulating substrate, and the outermost layer doped with a first select species of dopant; and

at least one first predetermined region comprising a dopant species of the same dopant type as that of the outermost layer of said stacked layers diffused therein at least to the depth of said semi-insulating substrate; and a second predetermined region ion implanted to a depth which is at least as deep as the outermost layer of said stacked layers which is doped with a dopant opposite from said first select species of dopant to render the second predetermined region substantially non-conductive, said first and second regions having common portions with respect to each other, and collectively defining at least one isolating barrier between the discrete portions of said semiconductor structure.

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PRINTER HEAD WITH LIGHT EMITTING ELEMENT ARRAY

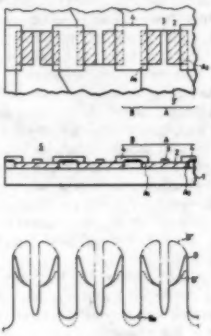
Manabu Urata, Tokyo, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo and Sanyo Electrical Co., Ltd., Osaka, both of, Japan

Filed Sep. 20, 1988, Ser. No. 246,598

Claims priority, application Japan, Sep. 24, 1987, 62-239674

Int. Cl.[5] H01L *33/00*

U.S. Cl. 357—17 **5 Claims**



1. A printer head having an array of light emitting elements, comprising:

a plurality of light emitting portions formed on a substrate;

electrode portions disposed on said respective light emitting portions; and

transparent film disposed only on edge portions of said respective light emitting portions in an aligning direction of the array.

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THIN FILM SOLAR CELL HAVING A CONCAVE N-I-P STRUCTURE

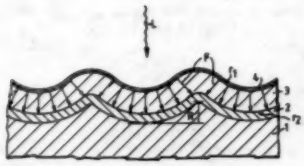
Roland Fischer, Nidderau; Gerhard Grabe, Rossdorf, and Ekkard Niemann, Maintal, al of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 245,998, Sep. 14, 1988, abandoned. This application Feb. 13, 1990, Ser. No. 481,650

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 8437522[U]; Dec. 21, 1984, 3446807

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **6 Claims**



1. A thin film solar cell comprising: a substrate having a surface with a plurality of contiguous concave portions with rounded junctions therebetween; a semiconductor structure made from amorphous silicon with three superimposed layers including a layer of N conductivity type, a layer of P conductivity type and a layer of intrinsic type positioned between said layer of N conductivity type and said layer of P conductivity type, said semiconductor structure being positioned on said

substrate with said layer of P conductivity type being positioned facing said substrate, a surface of said semiconductor structure having a plurality of contiguous concave portions with rounded junctions therebetween corresponding to said contiguous concave portions with rounded junctions therebetween of said substrate.

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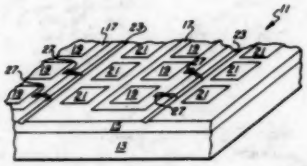
TWO COLOR INFRARED FOCAL PLANE ARRAY

Sebastian R. Borrello, Dallas, and Charles G. Roberts, McKinney, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 827,207, Feb. 4, 1986, abandoned, which is a continuation of Ser. No. 65,499, Apr. 30, 1984, abandoned. This application Mar. 3, 1987, Ser. No. 21,373

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **13 Claims**



1. A focal plane array, comprising:

(a) a body with a first surface,

(b) said body including regions of a first semiconductor material having photosensitivity in a first predetermined spectral band and extending to said first surface,

(c) said body including regions of a second semiconductor material different from said first semiconductor material and having photosensitivity in a second predetermined spectral band different from said first predetermined spectral band and extending to said first surface,

(d) said regions of said first material and said regions of said second material being disposed adjacent each other,

(e) a first plurality of gates, each of said first plurality of gates including a metal electrode and an insulating layer between said electrode and one of said regions, each of said gates of said first plurality positioned over said one of said regions of said first material and forming an MIS photodetector therewith,

(f) a second plurality of gates, each of said second plurality of gates including a metal electrode and an insulating layer between said electrode and the other of said regions, each of said gates of said second plurality positioned over said the other of said regions of said second material and forming an MIS photodetector therewith, and

(g) a plurality of electrical conduction lines in said body, each of said MIS photodetectors adjacent but separated from at least one of said conduction lines, each said line being coupled to one of said regions.

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BACKSIDE CONTACT BLOCKED IMPURITY BAND DETECTOR

Johannes B. de Bruin; Mary J. Hewitt, both of Santa Barbara, and James D. Phillips, Goleta, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Continuation of Ser. No. 878,946, Jun. 26, 1986. This application Oct. 9, 1987, Ser. No. 107,874

Int. Cl.[5] H01L *31/101*

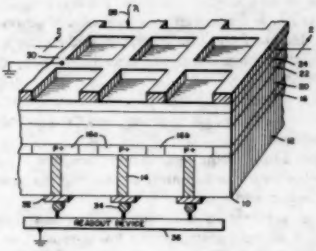
U.S. Cl. 357—30 **8 Claims**

1. A semiconductor array of radiation detectors comprising:

an electrically insulating substrate having generally parallel top and bottom surfaces, said substrate having a plurality of electrical conductors extending between first and second ends thereof completely through said insulating substrate between said top and bottom surfaces;

a detection layer of radiation detecting semiconductor material overlying said top surfaces of said substrate;

a plurality of electrically-conductive doped semiconductor regions disposed upon said top surface of said substrate and interposed between said detecting layer and said substrate, each of said doped semiconductor regions being in registration with and physically contacting said first end of one of said conductors for electrically coupling said conductor to said detection layer, each of said doped semiconductor regions defining, in conjunction with a



portion of said detection layer adjacent to said doped semiconductor region, a radiation detecting region;

a blocking layer having a reduced electrical conductivity overlying said detecting layer for inhibiting a flow of dark current; and

a substantially transparent layer of electrically conductive material overlying a surface of said blocking layer opposite said detection layer and providing a common electrical terminal to all of said radiation detecting regions, and wherein each one of said plurality of electrical conductors provides an individual electrical terminal for a respective one of said radiation detecting regions for coupling each of said regions to a readout means.

4,956,688

RADIATION RESISTANT BIPOLAR MEMORY

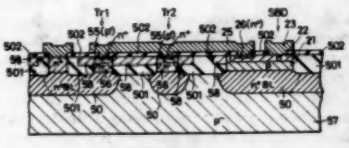
Noriyuki Honma, Kokubunji; Tohru Nakamura, Tanashi; Kazuo Nakazato; Motoaki Matsumoto, both of Kokubunji; Tetsuya Hayashida, Nishitama; Masaharu Kubo, Hachioji, and Kazuhiko Sagara, Suginami, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 792,286, Oct. 28, 1985, abandoned. This application Jun. 27, 1989, Ser. No. 374,570

Claims priority, application Japan, Oct. 29, 1984, 59-225738; Oct. 29, 1984, 59-225736; Oct. 29, 1984, 59-225737; Oct. 31, 1984, 59-227730; Mar. 20, 1985, 60-54404

Int. Cl.[5] H01L *29/72, 27/12, 29/04, 23/48*

U.S. Cl. 357—34 **37 Claims**



1. A semiconductor memory comprising: a semiconductor substrate; memory cells, each of which comprises first and second transistors formed on the semiconductor substrate and first and second load devices formed on the semiconductor

substrate; upper and lower word lines for selecting the memory cells; bit lines for reading and writing information of the memory cells; and coupling devices for electrically interconnecting the bit lines and the memory cells, wherein buried layers of the first and second transistors are isolated from the buried layers of the first and second load devices and/or from buried layers of the coupling devices, and wherein the first and second transistors employ the buried layers as emitters, respectively, wherein each memory cell is constructed by interconnecting a base of said first transistor and a collector of said second transistor and interconnecting a collector of said first transistor and a base of said second transistor, said load devices are first and second pnp transistors, a collector of said first pnp transistor is connected to a base of said first transistors and a collector of said second transistor, a collector of said second pnp transistor is connected to a base of said second transistor and a collector of said first transistor, and emitters of said first and second pnp transistors are electrically connected to said upper word line,

wherein a base of the first pnp transistor is connected to a collector of the first transistor and the base of the second transistor,

wherein a base of the second pnp transistor is connected to a collector of the second transistor and the base of the first transistor, and

wherein emitters of said first and second transistors are electrically connected to the lower word line.

4,956,689

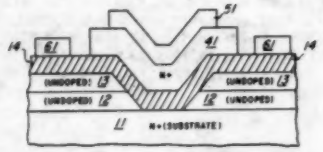
HIGH SPEED GALLIUM ARSENIDE TRANSISTOR AND METHOD

Han-Tzong Yuan, and Liem Th. Tran, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 338,445, Apr. 12, 1989, abandoned, which is a continuation of Ser. No. 65,433, Jun. 23, 1987, abandoned. This application Jan. 12, 1990, Ser. No. 462,926

Int. Cl.[5] H01L *29/72*

U.S. Cl. 357—34 **16 Claims**



1. A semiconductor integrated circuit including a bipolar transistor comprising a collector region, a base region and an emitter region forming a base to emitter junction, said base region comprising a doped region of a first layer of semiconductor material overlying said emitter region, the base to emitter junction of said transistor being defined by the bottom of a trench formed in at least a second layer of semiconductor material overlying the emitter region of said transistor, wherein electrical contact to said base region is accomplished by providing a region in said second layer along portions of the walls of said trench that is more highly doped than other portions of said second layer.

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ZERO CROSSING TYPE THYRISTOR

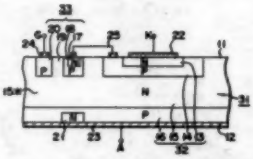
Minoru Kato, Nagoya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 143,936, Jan. 14, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 471,025

Claims priority, application Japan, Jan. 26, 1987, 62-14231

Int. Cl.[5] H01L *29/74, 29/06, 29/747, 49/00*

U.S. Cl. 357—38 **11 Claims**



1. A zero-crossing thyristor comprising:

a semiconductor substrate of a first conductivity type, having first and second main surfaces which are arranged substantially in parallel with and in opposition to each other;

a first base layer of a second conductivity type, opposite to the first conductivity type, which is formed in said substrate and exposed to the first main surface;

a second base layer of the second conductivity type, which is formed in said substrate and exposed to the first main surface, said second base layer being isolated from said first base layer by means of semiconductor regions constituting said semiconductor substrate;

a first emitter layer of the second conductivity type, which is formed in said substrate and exposed to the first main surface, said first emitter layer being isolated from said first and second base layers by means of said semiconductor regions;

a second emitter layer of the first conductivity type, which is formed in said first base layer and exposed to the first main surface;

a third emitter layer of the first conductivity type, which is formed in said second base layer and exposed to the first main surface;

a fourth emitter layer of the second conductivity type, which is formed in said substrate and exposed to the second main surface; and

connecting means for connecting said third emitter layer to said first base layer,

wherein said zero-crossing type thyristor has a gate, a cathode, and an anode which are respectively connected to said first, second, and fourth emitter layers;

wherein said second emitter layer, first base layer, semiconductor region, and fourth emitter layer constitute a vertical main thyristor of said zero-crossing type thyristor;

wherein said third emitter layer, second base layer, semiconductor region, and first emitter layer constitute a lateral driving thyristor of said zero-crossing type thyristor; and

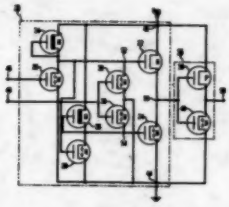
wherein the dimensions and the impurity concentrations of said second emitter layer, first base layer, semiconductor region and first emitter layer are so determined that the voltage, between the gate and cathode of said lateral driving thyristor, is more than the voltage between the anode and cathode of said vertical main thyristor, required for turning on said vertical main thyristor.

4,956,691

NMOS DRIVER CIRCUIT FOR CMOS CIRCUITRY

Jeffrey L. Culley, West Lafayette; Darrell E. Frazier, and Anthony E. Frisch, both of Kokomo, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Mar. 24, 1989, Ser. No. 328,264
Int. Cl.[5] H01L 27/02
U.S. Cl. 357—41 16 Claims



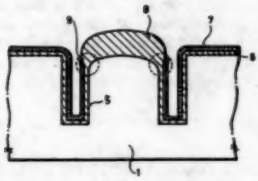
1. Circuitry comprising first (pullup) and second (pulldown) enhancement mode n-channel MOS transistors in a common p-type silicon substrate, each transistor comprising n-type source and drain regions spaced apart along said substrate and gates spaced from the substrate by a gate oxide layer extending between the source and drain regions, the source-drain paths of the two transistors being connected in series, and the gates adapted to be driven in opposite phase, characterized in that the surface of the substrate portion of the source-drain path of the second transistor includes a doping of accepter ions higher than in a bulk portion of the substrate for setting the surface potential but the surface of the substrate portion of the source-drain path of the first transistor is free of doping with acceptor ions higher than the bulk of the substrate.

4,956,692

SEMICONDUCTOR DEVICE HAVING AN ISOLATION OXIDE FILM

Hiroji Ozaki; Masahiro Yoneda; Ikuo Ogoh; Yoshinori Okumura; Wataru Wakamiya, and Mamo Nagatomo, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,706
Claims priority, application Japan, Nov. 9, 1987, 62-282567
Int. Cl.[5] H01L 27/12
U.S. Cl. 357—49 4 Claims



1. A semiconductor device having an isolation oxide film, comprising:

a semiconductor substrate (1) having a main surface and a trench (5) formed on said main surface,

a plurality of functional elements (12) formed on said semiconductor substrate (1), and

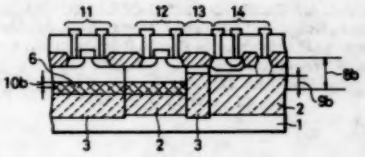
an isolating film (8) for isolating said functional elements (12), formed on the main surface of said semiconductor substrate (1) near said trench (5), an end of a bird's beak of said isolation oxide film (8) being located on a side surface of said trench (5), said side surface of said trench (5) forming a rounded edge with said main surface of said semiconductor substrate and so that said side surface of said trench (5) and said main surface of said semiconductor substrate form an angle greater than an acute angle.

4,956,693

SEMICONDUCTOR DEVICE

Yasuo Sawahata; Ryuichi Saito, and Naohiro Momma, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 19, 1987, Ser. No. 28,140
Claims priority, application Japan, Mar. 20, 1986, 61-60542
Int. Cl.[5] H01L 29/167
U.S. Cl. 357—64 6 Claims



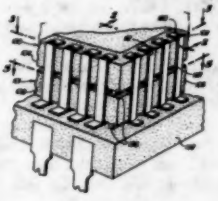
1. In a semiconductor device in which at least one of a MOS element and a bipolar element is provided in an element-forming region of a semiconductor substrate, and which has a buried layer formed between said element-forming region and a support region therefor, the improvement wherein an impurity-containing semiconductor layer, containing atoms of at least one kind of element selected from the group consisting of oxygen, nitrogen, carbon, argon, neon, krypton and helium, is provided on at least a portion of said buried layer so as to suppress swelling of the buried layer as compared to swelling of the buried layer without said impurity-containing semiconductor layer thereon, and wherein said device includes both a MOS element and a bipolar element, the impurity-containing semiconductor layer being formed only under the MOS element.

4,956,694

INTEGRATED CIRCUIT CHIP STACKING

Floyd Eide, Huntington Beach, Calif., assignor to Dense-Pac Microsystems, Inc., Garden Grove, Calif.

Filed Nov. 4, 1988, Ser. No. 267,223
Int. Cl.[5] H01L 23/02
U.S. Cl. 357—74 25 Claims



1. An electronic circuit comprising:

a first electronic component having a first data input/output terminal and a first enable terminal;

a second electronic component having a second data input-/output terminal and a second enable terminal;

stacking means for stacking the first electronic component on the second electronic component;

first connecting means for electrically connecting the first data input/output terminal to the second data input/output terminal;

first conducting means connected to the first enable terminal

for providing electrical conduction to the first enable terminal; and

second conducting means connected to the second enable terminal for providing electrical conduction to the second enable terminal independent of the first enable terminal.

4,956,695

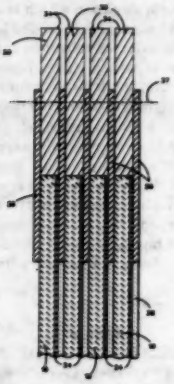
THREE-DIMENSIONAL PACKAGING OF FOCAL PLANE ASSEMBLIES USING CERAMIC SPACERS

William L. Robinson, El Toro, and John C. Roth, Jr., Glendora, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 12, 1989, Ser. No. 351,122

Int. Cl.[5] H01L *23/02, 23/12*

U.S. Cl. 357—74 **14 Claims**



1. A three-dimensional focal plane assembly comprising a plurality of die assemblies stacked adjacent one another, wherein each die assembly comprises:

a silicon electronic die incorporating electronic circuitry and having first and second faces separated by a first thickness, and a third face between said first and second faces across said first thickness;

a dielectric layer having first and second dielectric faces, wherein said first dielectric face is bonded to said second face of said die, said dielectric layer having a second thickness between its first and second faces and having a third dielectric face, between said first and second dielectric faces across said second thickness, wherein said third dielectric face and said third die face are substantially coplanar;

a ceramic spacer having first and second surfaces, and having a third thickness between said first and second surfaces substantially the same as said first and second thickness together, said spacer additionally having a third spacer surface, between said first and second spacer surfaces, wherein said third spacer surface abuts said third die surface and said third dielectric surface so that said first die face and said first spacer surface are substantially coplanar and said second dielectric face and said second spacer surface are substantially coplanar; and

a gold ribbon lead bonded to said first face of said silicon die and to said first surface of said ceramic spacer.

4,956,696

COMPRESSION LOADED SEMICONDUCTOR DEVICE

Richard J. Hoppe; Steven E. Jackson, and William K. Anderson, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 24, 1989, Ser. No. 397,831

Int. Cl.[5] H01L *23/42*

U.S. Cl. 357—79 **22 Claims**

1. A compression loaded semiconductor device comprising:

a cylindrical semiconductor device having a first region on a first face, a control region on the first face having a central portion and a second region on a second face with the second face being opposed to the first face;

an upper cover in electrical contact with the first region of the semiconductor device;

a lower cover in electrical contact with the second region of the semiconductor device;

an electrically conductive contact having an external control terminal, an annulus electrically connected to the external control terminal, a plurality of projections electrically connected to the annulus and projecting radially inward, and a center connected to the radially inward projections and to the central portion of the control region; and

first and second annular insulators, each annular insulator having a plurality of faces, the upper cover being bonded to a first face of the first insulator, a second face of the first insulator being bonded to a first attachment ring with the first attachment ring being bonded to the annulus, the lower cover being bonded to a first face of the second insulator, a second face of the second insulator being bonded to a second attachment ring with the second attachment ring being bonded to &he annulus, the bonds defining a sealed chamber containing the semiconductor device.

4,956,697

MICROWAVE MONOLITHIC INTEGRATED CIRCUIT WITH HEAT RADIATING ELECTRODE

Michihiro Kobiki; Masahiro Yoshida, and Takahide Ishikawa, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,677

Claims priority, application Japan, Dec. 14, 1987, 62-315595

Int. Cl.[5] H01L *23/02*

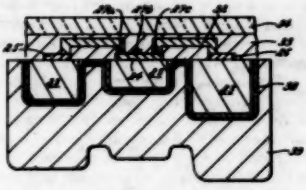
U.S. Cl. 357—81 **10 Claims**

1. A microwave monolithic integrated circuit comprising:

a substrate having upper and lower opposed surfaces;

at least one active region and at least one passive region produced on the upper surface of the substrate, said regions being electronically coupled to one another; and

a heat sink produced on the lower surface of the substrate;
wherein the substrate thickness beneath the active region is smaller than the substrate thickness beneath at least one passive region, thereby disposing the heat sink near the



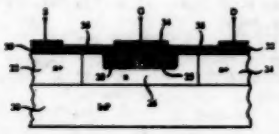
active region to improve heat dissipation therefrom, the substrate thickness beneath the at least one passive region being adapted to provide the passive region with a terminating impedance of a predetermined magnitude.

4,956,698

GROUP III–V COMPOUND SEMICONDUCTOR DEVICE HAVING P-REGION FORMED BY BE AND GROUP V IONS

Kou-Wei Wang, Piscataway, N.J., assignor to The United States of America as represented by the Department of Commerce, Washington, D.C.

Division of Ser. No. 79,371, Jul. 29, 1987, Pat. No. 4,818,721. This application Nov. 30, 1988, Ser. No. 278,125
Int. Cl.[5] H01L 29/72
U.S. Cl. 357—91 3 Claims



1. A semiconductor device comprising
a first region of a Group III–V compound semiconductor, and
a p-type region formed in said first region by Be ions and a Group V ion species other than the Group V species of said compound, wherein
said first region comprises InP, and
said Group V ion species comprises As ions.

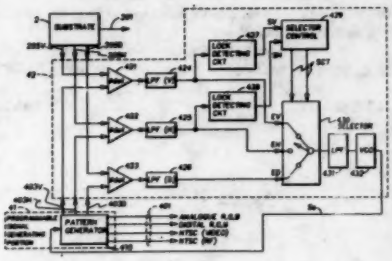
4,956,699

SIGNAL SYNCHRONIZING SYSTEM

Mitsuo Obashi, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan

Filed Jan. 24, 1989, Ser. No. 301,043
Claims priority, application Japan, Jan. 27, 1988, 63-16572
Int. Cl.[5] H04N 5/04
U.S. Cl. 358—149 8 Claims

1. A signal synchronizing system, comprising:
a first circuit having a plurality of sync output signals;
a second circuit having a plurality of sync output signals corresponding to said sync signals of said first circuit; and
means for receiving and synchronizing output signals from said first and second circuits and for generating a control signal to said second circuit, said synchronizing means comprising:
a plurality of phase detectors corresponding to each of said sync signals of each of said first and second circuits;
a selecting means for selecting outputs of said phase detectors;
at least one lock condition detecting means connected to one of said phase detectors;
means for controlling said selecting means in accordance with an output of said lock condition detecting means; and



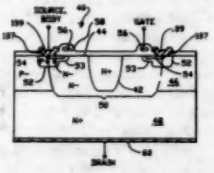
means for outputting said control signal to said second circuit, said outputting means being provided between said selecting means and said second circuit.

4,956,700

INTEGRATED CIRCUIT WITH HIGH POWER, VERTICAL OUTPUT TRANSISTOR CAPABILITY

Richard A. Blanchard, Los Altos, and Richard K. Williams, Cupertino, both of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.

Continuation of Ser. No. 85,792, Aug. 17, 1987, abandoned. This application May 22, 1989, Ser. No. 356,631
Int. Cl.[5] H01L 29/78
U.S. Cl. 357—23.4 20 Claims



1. A power transistor device, which comprises a substrate of a first conductivity type, an epitaxial layer of a second conductivity type and a given resistivity on said substrate, forming a p—n junction therewith and having an upper surface, a source region of the first conductivity type extending from the upper surface in to said epitaxial layer and being separated therefrom by a p—n junction, a vertical drain region of the first conductivity type spaced from said source region, having a portion with a higher dopant concentration than said epitaxial layer, extending from the upper surface through said epitaxial layer to said substrate and forming p—n junction with said epitaxial layer, an insulating layer on the upper surface extending between said source region and said vertical drain region, a conductive gate electrode on said insulating layer extending between said source region and said vertical drain region, a conductive electrode electrically connected to said source region, and a conductive electrode electrically connected to said substrate and, through said substrate, to said vertical drain region, said source region being separated from said vertical drain region by a region of the second conductivity type extending from the upper surface into said epitaxial layer a greater extent than said source region and having a portion between said source region and said vertical drain region, said source region being contained at least in part within said region

of the second conductivity type and having a higher dopant concentration than a remainder of said epitaxial layer.

4,956,701

FREQUENCY CONVERTER FOR A DIGITAL CHROMINANCE MODULATOR

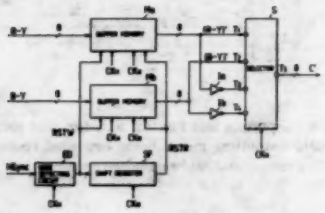
Takehiko Shioda, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 405,244

Claims priority, application Japan, Apr. 28, 1989, 61-107873

Int. Cl.[5] H04M *11/22*

U.S. Cl. 358—11 **5 Claims**



1. A frequency converter circuit, comprising:

memory means for temporarily storing first and second color signal data;

switching means having said first and second color signal data output from said memory means and third and fourth color signal data which are complements of said first and second color signal data input to first through fourth input terminals, respectively, said switching means for selectively and alternatively switching the data of said first, second, third and fourth color signal data which have been input to said switching means, by means of a switching signal with a frequency which is four times as high as that of a color subcarrier which is to be used to generate a carrier chrominance signal to be output;

buffer control means for controlling a writing and reading of said first and second color signal data to and from said memory means according to first and second clock signals which are different from each other in frequency; and

wherein said second clock signal is used as said switching signal for said switching means.

4,956,702

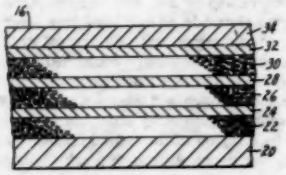
IMAGING APPARATUS INCLUDING THREE LASER DIODES AND A PHOTOGRAPHIC ELEMENT

John M. McQuade, Woodbury, and Richard L. Paidosh, Saint Anthony, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 736,252, May 22, 1985, Pat. No. 4,821,113. This application Jan. 30, 1989, Ser. No. 303,851

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **70 Claims**



33. A laser diode imaging apparatus comprising a photographic element having at least three silver halide emulsion layers on a substrate, each of said three silver halide emulsion layers being capable of forming a single color image of a different color dye, said three silver halide emulsion layers comprising, in any order, a first silver halide emulsion layer sensitized to a portion of the infrared region of the electromagnetic spectrum, a second silver halide emulsion layer sensitized to a different portion of the infrared region of the electromagnetic spectrum, the wavelengths of maximum spectral sensitivity for said first and second layer differing by at least 15 nm, and a third silver halide emulsion layer sensitized to a third portion of the electromagnetic spectrum, the wavelength of maximum spectral sensitivity for said third layer differing by at least 15 nm from the wavelength of maximum spectral sensitivity of said first and second layers, the sensitivity of each of said three silver halide emulsion layers being such that between any two layers having their maximum sensitivity in the infrared, the emulsion layer having the shorter wavelength of maximum spectral sensitivity has a speed which is at least 0.2 log E units faster than the other of said any two layers, and three laser diodes for exposing said photosensitive element, each laser diode emitting radiation in the region of the electromagnetic spectrum and at a particular wavelength which is different from that of any of the other laser diodes and which corresponds to a different one of said wavelengths of maximum spectral sensitivity of said first, said second and said third emulsion layers.

4,956,703

PRINT SIMULATION APPARATUS FOR ADJUSTING THE COLOR SEPARATION CONDITIONS OF A COLOR SCANNER

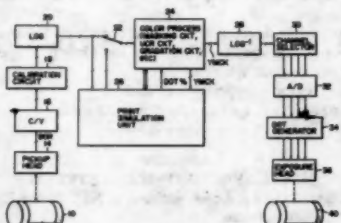
Tetsuji Uzuda, Kawagoe; Takashi Kuramoto, Oomiya; Takeo Onga, Saitama; Teruo Suzuki, Kamifukuoka, and Takeshi Suwa, Tokyo, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,633

Claims priority, application Japan, Sep. 14, 1987, 62-230044; Nov. 17, 1987, 62-289761; Nov. 17, 1987, 62-289762; Nov. 17, 1987, 62-289763

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—76 **7 Claims**



1. A print simulation apparatus connected to a color scanner having pickup means for obtaining image signals of a color original, color separation means for color-separating the image signals obtained by said pickup means into color component signals, color process means for adjusting the color separation conditions of the color component signals separated by the color separation means, and means for forming a color separation plate based on the adjusted color component signals, said apparatus comprising:

first memory means for receiving and storing the image signals output from said pickup means;

means for reading out the image signals from said first memory means and for supplying the read-out image signals to said color separation means;

second memory means for storing the image signals output from said color separation means; and

display means for displaying the image signals stored in said second memory means.

4,956,704

IMAGE PROCESSING APPARATUS AND METHODS FOR MAKING A CREATIVE IMAGE FROM AN ORIGINAL IMAGE

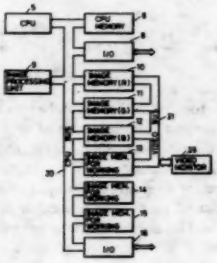
Shigeki Yamada, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,465

Claims priority, application Japan, Oct. 23, 1987, 62-266471; Oct. 23, 1987, 62-266472; Oct. 23, 1987, 62-266473

Int. Cl.[5] G09G 1/28

U.S. Cl. 358—80 52 Claims



35. An image processing apparatus comprising:

means for supplying an original image;

means for dividing the original image into a plurality of areas, wherein said dividing means detects an edge of the original image and divides the original image by a closed curve using the edge; and

means for changing at least one of the plurality of areas of the original image to halftone.

4,956,705

ELECTRONIC METHOD AND APPARATUS FOR STEREOSCOPIC PHOTOGRAPHY

Douglas Wright, S. Farmingdale, N.Y., assignor to Dimensional Visions Group, Philadelphia, Pa.

Filed Mar. 10, 1989, Ser. No. 321,921

Int. Cl.[5] H04N 13/00

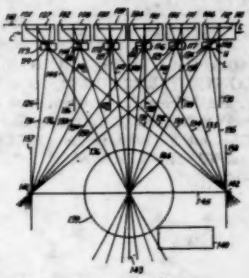
U.S. Cl. 358—88 34 Claims

1. Apparatus for electronically producing a stereoscopic photograph of an object comprising:

electronic camera means having means for converting the received object of an image into an electrical video signal,

optical means for establishing a field of view relative to the object being photographed to image on said electronic camera converting means,

means for operating said electronic camera means and said optical means relative to each other to produce the same field of view of the object being photographed with the camera means located at each of plurality of predetermined positions which are spaced from each other and the image plane of the converting means being substantially parallel to the field of view object plane at each of said positions,



means for digitizing each said video signal corresponding to each image, and

means responsive to the plurality of digitized video signals for producing a viewable output corresponding to the plurality of photographs taken by said camera means.

4,956,706

APPARATUS FOR PROCESSING IMAGE

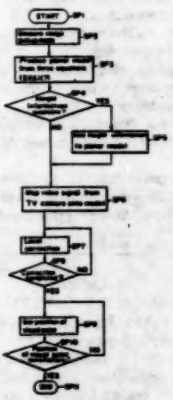
Akio Ohba, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 16, 1989, Ser. No. 367,372

Claims priority, application Japan, Jan. 21, 1988, 63-152855

Int. Cl.[5] H04N 5/262

U.S. Cl. 358—93 8 Claims



1. An apparatus for processing an image of an object capable of moving the apparent position of the visual point from which the object is viewed with respect to an image displayed on a monitor, comprising:

a. a camera having an image pickup device for picking up an image of said object;

b. producing means for producing a model of a surface of said object in a three-dimensional coordinate system based on the coordinates of picture elements on the image pickup device of said camera and the image pickup angle of said camera with respect to said object;

c. mapping means for mapping image data output from said camera onto said model produced by said producing means;

d. transformation means for rotationally transforming said model with said image data mapped thereon in said three-dimensional coordinate system such that the apparent visual point is changed; and

e. a monitor for displaying said model with said image data mapped thereon.

4,956,707

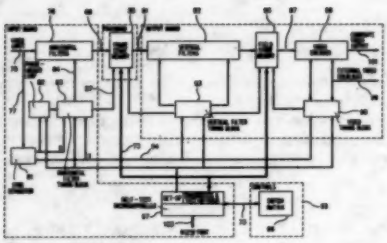
ADAPTIVE GRAPHICS VIDEO STANDARDS FORMAT CONVERTER USER-INTERFACE

David Oakley, and Michael J. Hellmer, both of San Diego, Calif., assignors to Megatek Corporation, San Diego, Calif.

Filed Jul. 27, 1989, Ser. No. 387,487

Int. Cl.[5] H04N *7/01, 11/20, 5/222*

U.S. Cl. 358—140 **14 Claims**



11. A method for interactively setting up a video standards converter for receiving video signals in one format and converting them to signals in a different format, said method comprising the steps of:

actuating function switches in a control switch matrix;

sampling the switch matrix by means of a microcontroller to detect actuated switches;

generating signals by the microcontroller in response to each actuated function switch;

selectively coupling said generated signals to the video standards converter to modify the video signal transformation process therein;

matching the two dimensional sampling aperture of the standards converter to the timing of the incoming video signals; and

continuing to actuate function switches and modifying the converter output video signals interactively until optimal video output from the converter is achieved as determined visually.

4,956,708

FRAME MEMORY CONTROL SYSTEM

Hirokazu Itagaki, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1989, Ser. No. 362,280

Claims priority, application Japan, Jun. 9, 1988, 63-140509

Int. Cl.[5] H04N *7/01*

U.S. Cl. 358—140 **5 Claims**

1. A frame memory control system for controlling a frame memory in accordance with an INL signal that indicates whether the scanning mode is sequential or interlaced and a T/D signal that that differentiates between write transfer access and display access, causing said frame memory to receive data at one rate from a video data generator and provide said data at another, possibly different rate to a parallel/serial converter, comprising:

a column address counter for generating a column address and furnishing said column address to said frame memory;

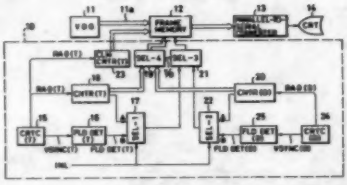
a first field detection circuit for generating a FLDDET(T) signal that differentiates between even and odd fields in interlaced scanning;

a first row address counter for generating a first row address;

a first selector for selecting either said FLDDET(T) signal or the most significant bit of said first row address according to said INL signal and furnishing the selected signal as output;

a second field detection circuit for generating a FLDDET(D) signal that differentiates between even and odd fields in interlaced scanning;

a second row address counter for generating a second row address;



a second selector for selecting either said FLDDET(D) signal or the most significant bit of said second row address according to said INL signal and furnishing the selected signal as output;

a third selector for selecting the output of said first selector or the output of said second selector according to said T/D signal and furnishing the selected signal to said frame memory; and

a fourth selector for selecting either the lower bits of said first row address or the lower bits of said second row address according to said T/D signal and furnishing the selected bits to said frame memory.

4,956,709

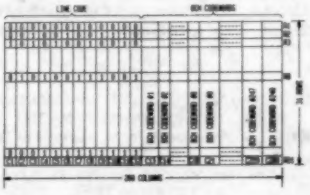
FORWARD ERROR CORRECTION OF DATA TRANSMITTED VIA TELEVISION SIGNALS

Mark S. Richer, Alexandria, Va.; Aderemi A. Adeyeye, Adelphi, Md., and Hermann Helgert, Washington, D.C., assignors to PBS Enterprises, Inc., Alexandria, Va. and EEG Enterprises, Inc., Farmingdale, N.Y.

Filed Mar. 11, 1988, Ser. No. 167,016

Int. Cl.[5] H04N *5/08*

U.S. Cl. 358—147 **27 Claims**



26. A receiver for digital data which is transmitted within the horizontal lines of a television signal, comprising:

a memory for receiving the data transmitted within the lines of the television signal and storing the lines of data in the form of an array such that each line of data occupies a predetermined row of the array identified by the received data;

means for detecting and correcting bit errors based upon the received bits in a column of the array; and

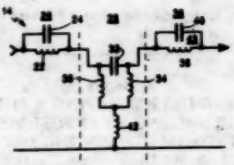
means for retrieving corrected blocks of data from the respective columns of the array.

4,956,710

TELEVISION RECEIVER TUNER HIGH PASS INPUT FILTER WITH CB TRAP

Michael A. Pugel, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 14, 1989, Ser. No. 339,575
Int. Cl.[5] H04B 1/16
U.S. Cl. 358—188 5 Claims



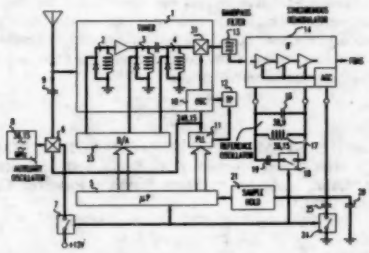
1. In a television receiver, a television signal processing system for highpass filtering the television signal comprising:
an LC parallel resonant input filter section in series with and having an input for receiving said signal,
an LC parallel resonant output filter section in series with and having an output of a highpass filtered version of said signal, and
a generally pi configured intermediate filter section with an input terminal for receiving said signal from said input filter section and an output terminal for conveying said signal to said output section, said intermediate section comprising a capacitor coupled between the input terminal and the output terminal, a first and a second inductor each coupled from one of the terminals to a common junction, and a third inductor coupled from the common junction to a signal ground.

4,956,711

AUTOMATIC BALANCING SYSTEM FOR COMMUNICATIONS RECEIVER APPARATUS

Gerhard Maier, Dauchingen, Fed. Rep. of Germany, assignor to Deutsche Thompson-Brandt GmbH, Villingen-Schwenaingen, Fed. Rep. of Germany

Filed Dec. 27, 1984, Ser. No. 686,649
Claims priority, application Fed. Rep. of Germany, Dec. 27, 1983, 3347132
Int. Cl.[5] H03J 7/08
U.S. Cl. 358—191.1 17 Claims



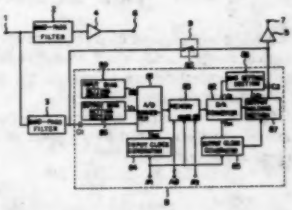
1. An automatic balancing circuit for a communications receiver apparatus such as a color television receiver set comprising
a phase locked loop circuit;
a tuning oscillator connected to the phase locked loop circuit and adjustable to the phase locked loop circuit;
an antenna having an output;
a tuner connected to the antenna;
an intermediate frequency component device fed with signals originating in the tuner and serving as an evaluation circuit during the automatic balancing process and having an output;
an automatic gain control circuit AGC having an input connected to the output of the intermediate frequency component and having an output providing a measurement voltage;
a sample-and-hold circuit having an input connected to the output of the automatic gain control circuit and having an output;
a microprocessor having an input connected to the output of the sample-and-hold circuit;
a reference oscillator circuit required for a synchronous demodulator comprised in an intermediate component device and connected to the intermediate frequency component device, which reference oscillator circuit is controlled by the microprocessor during the automatic balancing process and switched in its resonance frequency to a frequency, which corresponds to an arithmetical average value of intermediate picture carrier frequency and intermediate sound carrier frequency.

4,956,712

APPARATUS FOR DELAYING A SUB-AURAL SIGNAL IN A TELEVISION RECEIVER

Sam P. Hong, Seoul, Rep. of Korea, assignor to Goldstar Co. Ltd., Seoul, Rep. of Korea

Filed Apr. 28, 1989, Ser. No. 344,376
Claims priority, application Rep. of Korea, Apr. 30, 1988, 5037/1988
Int. Cl.[5] H04N 5/60
U.S. Cl. 358—198 4 Claims



1. An apparatus for delaying a sub-aural signal in a television receiver, comprising:
a first band-pass filter for receiving a main aural signal from a plurality of aural signals input to a multiple aural signal input terminal and developing an output signal therefrom;
a second band-pass filter for receiving the sub-aural signal from said plurality of aural signals input to said multiple aural signal input terminal and developing an output signal; therefrom
a first amplifier for amplifying and outputting said output signal from said first band-pass filter to a main aural signal output terminal;
a delaying section for outputting said output from said second band-pass filter by a predetermined delayed time interval in response to a microcomputer when a sub-aural signal delay is selected;
a switching section for providing said output signal from said second band-pass filter in response to said microcomputer when said sub-aural signal delay fails to be selected; and
a second amplifier for amplifying and outputting the output signal from said delaying section when said sub-aural

signal delay is selected from said switching section when said sub-aural signal delay fails to be selected.

4,956,713

IMAGE PICK-UP APPARATUS USING PHOTO-TO-PHOTO CONVERSION ELEMENT

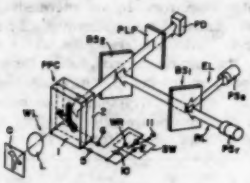
Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Tsutou Asakura, Yokohama; Masato Furuya, Yokosuka; Hirohiko Shinonaga, Yokohama, and Hiromichi Tai, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed May 12, 1989, Ser. No. 350,798

Claims priority, application Japan, May 13, 1988, 63-116157; May 19, 1988, 63-122281

Int. Cl.[5] H04N 5/30

U.S. Cl. 358—209 8 Claims



1. An image pickup apparatus comprising:

means for forming an electric charge image corresponding to an optical image of an object to be image-picked up in a photo-photo conversion element constructed of two transparent electrodes with at least a photoconductive layer and a photo-modulation layer being interposed therebetween, by applying a light from said object of said photoconductive layer;

means for reading said electric charge image corresponding to the optical image of said object as optical information, by applying a reading light to said photo-modulation layer;

means for erasing said electric charge image corresponding to the optical image of said object, wherein an erase operation and read operation are intermittently repeated for said electric charge image; and

said reading means operating in a limited period which is substantially short compared to a period in which said forming means operate.

4,956,714

IMAGE PICKUP APPARATUS

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutou Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 139,005, Dec. 29, 1987, Pat. No. 4,831,452. This application Jan. 24, 1989, Ser. No. 301,324

Claims priority, application Japan, Jan. 24, 1988, 63-13251; Jan. 25, 1988, 63-13943; Jan. 26, 1988, 63-15263; Jan. 26, 1988, 63-15264

Int. Cl.[5] H04N 5/30

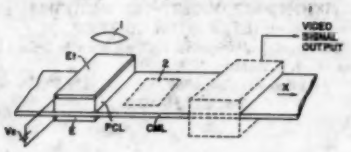
U.S. Cl. 358—213.11 6 Claims

1. An image pickup apparatus comprising:

a movable charge storage member;

a photo-charge conversion unit comprising a photoconductive layer member having a transparent electrode, an electrode, and means for applying an electric field between said transparent electrode and said electrode, said photo-charge conversion unit opposing said charge storage member; and

means for focussing an optical image of an object through said transparent electrode onto an image focussing surface of said photo-charge conversion unit via a taking lens, and for forming an electric charge image corresponding to



said optical image of the object on said charge storage member.

4,956,715

IMAGE SENSING DEVICE HAVING A PHOTOMETRIC ELEMENT FOR SETTING AN EXPOSURE CONDITION FOR THE IMAGE SENSING DEVICE

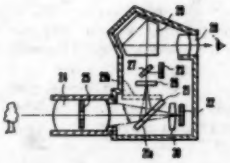
Tadashi Okino; Nobuaki Date; Nobuo Tezuka, and Syuichiro Saito, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 169,074, Mar. 16, 1988, abandoned, which is a continuation of Ser. No. 726,097, Apr. 23, 1985, abandoned. This application Sep. 19, 1989, Ser. No. 409,283

Claims priority, application Japan, Apr. 24, 1984, 59-82605

Int. Cl.[5] H04N 3/19

U.S. Cl. 358—213.19 25 Claims



1. An image sensing device comprising:

(a) image sensing means;

(b) a photometric element;

(c) accumulating time control means for variably controlling the storing time of said image sensing means;

(d) exposure information forming means for forming first exposure control information based on an output of said photometric element, and for forming second exposure control information based on an output of said image sensing means, under a condition in which the accumulating time is controlled by said accumulating time control means; and

(e) exposure control means for correcting the exposure condition of said image sensing means on the basis of said second exposure control information, said exposure control means having a lower responsiveness than said accumulating time control means.

4,956,716

IMAGING SYSTEM EMPLOYING CHARGE AMPLIFIER

Mary J. Hewitt, and Johannes B. de Bruin, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Feb. 21, 1989, Ser. No. 312,262

Int. Cl.[5] H04N 3/14

U.S. Cl. 358—213.27 14 Claims

11. An imaging system responsive to incident radiation of a scene for forming an image of the scene, the system comprising:

an array of detectors;

an optical unit for focusing incident radiation of a scene upon said detectors, said array of detectors being positioned at a focal plane of said optical unit for detecting said radiation, said detectors producing signals in response to the incident radiation;

a set of amplifiers, individual ones of the amplifiers being coupled to respective ones of the detectors for amplifying signals of the detectors;

timing means for staggering the operations of individual ones of said amplifiers;

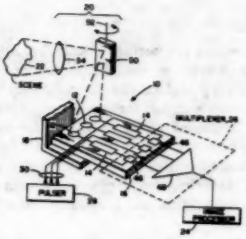
muliplexing means for combining output signals of the amplifiers; and

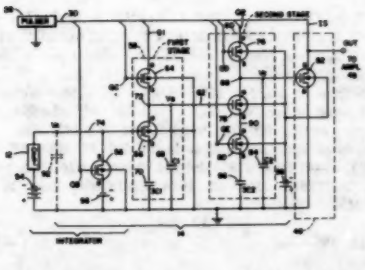
processor means coupled to said set of amplifiers via said muliplexing means for forming an image of the scene from the amplifier output signals;

and wherein each of said amplifiers comprises:

a first transistor and a second transistor, a source terminal of one of said transistors being connected to a drain terminal of the other of said transistors at a junction;

an energy storage element connected to said junction;





charge means connected to a gate terminal of said first transistor for activating said first transistor to charge said storage element with electric energy during a first interval, said charge means acting periodically to provide a succession of said first intervals;

signal means interconnecting a respective one of said detectors to a gate terminal of said second transistor for applying a sample of a detector signal to said second transistor during a second interval subsequent to said first interval, said first and said second transistors acting to amplify said signal by imparting energy thereto extracted from said storage element, said signal means acting periodically to provide a succession of signal samples during a succession of said second intervals; and

disconnect means connected to a drain terminal of said first transistor and being operative periodically to disconnect said first and said second transistors from any external source of power during said second interval, said charge means inhibiting a flow of power from any external source of power during a succession of third intervals wherein each of said third intervals extends from the end of a second interval to the next occurrence of a first interval.

4,956,717

METHOD OF AND APPARATUS FOR CONTROLLER DUPLEX PAGE PRINTER

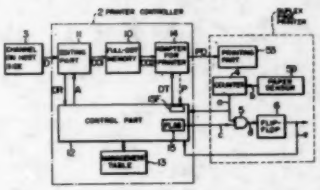
Kenji Suzuki, Hadano; Kikuo Hatazawa, Atsugi, and Shinichi Kishi, Mito, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,635

Claims priority, application Japan, Dec. 18, 1987, 62-321020

Int. Cl.[5] H04N *1/23*; G01D *15/28*; G03B *27/52*

U.S. Cl. 358—296 **7 Claims**



1. A method of controlling a duplex page printer operating in such a manner that a printing operation is first performed for the first surface of each of a plurality of sheets of paper which are successively supplied from a paper feed mechanism to a printing part, the sheets of paper are then sent to a paper transfer path having a paper turning-over mechanism, to be sent back to the printing part, a printing operation is performed for the second surface of each sheet of paper, and then the sheets of paper are sent to the outside, the method comprising the steps of:

preparing a dot pattern memory for storing dot pattern data to be printed on each surface of the sheets of paper;

converting input printing data into dot pattern data sequentially for each surface of said sheets;

storing the converted dot pattern data in respective page areas of a dot pattern memory which are allotted to the first and second surfaces of said sheets;

starting a printing operation when the printing operation for the first and second surfaces of the first sheet of paper has been converted into dot pattern data and stored in said memory; and

starting to convert input printing data for the following sheet of paper into dot pattern data at the same time as the said printing operation is started.

4,956,718

TONAL CONVERSION METHOD FOR PICTURES

Takashi Numakura, Tokyo; Susumu Kitazawa, Kanagawa; Junichi Naya, Miyagi, and Iwao Numakura, Tokyo, all of Japan, assignors to Yamatoya & Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 390,910

Claims priority, application Japan, Aug. 23, 1988, 63-207326

Int. Cl.[5] H04N *1/23*

U.S. Cl. 358—298 **6 Claims**

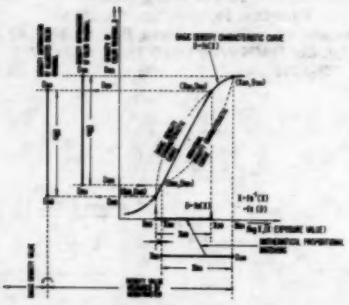
1. A method for producing a reproduced picture by tonal conversion of an original picture on the basis of pictorial information from the original picture, which comprises:

(i) setting the density value (H_n) of the highlight area of the original picture, the density value (S_n) of the shadow area of the original picture and an individual density characteristic curve $fD_n(x)$ ranging from said H_n to said S_n, where x indicates a physical value correlated to the densities (D) of the original picture and reproduced picture, such as exposure;

(ii) setting the density value (H_o) of the highlight area and the density value (S_o) of the shadow area of a standard

original picture, which can provide a reproduced picture having suitable picture quality for the visual feeling of men, as well as a standard density characteristic curve $fD_o(x)$ ranging from said H_o to said S_o;

(iii) adjusting the individual density characteristic curve $fD_n(x)$ to the standard density characteristic curve $fD_o(x)$ and further determining an adjusted density information value D_ϕ on the standard original picture corresponding to the



density information value D_n of a desired picture element on the original picture; and

(iv) then conducting tonal conversion of the picture in said density range on the basis of the thus-obtained adjusted density information value D_ϕ on the standard original picture corresponding to the density information value D_n of the desired picture element on the original picture by using the following tonal conversion formula:

$$y = y_H + \frac{\alpha[1 - 10^{-k(D_\phi - H_\phi)}]}{\alpha - \beta} \cdot (y_S - y_H)$$

where

$(D_\phi - H_\phi)$: the base density information datum obtained by subtracting the density value H_ϕ of the highlight area of the standard original picture from the adjusted density information value D_ϕ on the standard original picture corresponding to the density information value D_n of the desired picture element on the original picture;

y: the halftone density intensity on the reproduced picture, corresponding to the desired picture element on the original picture;

y_H: a desired halftone density intensity set for the highlight area on the picture to be reproduced;

y_S: a desired halftone density intensity set for the shadow area on the picture to be reproduced;

α: the surface reflectance of a base material on which the reproduced picture is to be shown;

β: a value obtained from $\beta = 10^{-\gamma}$;

κ: another value determined from $\gamma/(S_o - H_\phi)$; and

γ: a desired optional factor.

4,956,719

LOW-FREQUENCY CONVERTER FOR CARRIER CHROMINANCE SIGNAL

Hiromitsu Yamashita, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1988, Ser. No. 199,342

Claims priority, application Japan, Jul. 30, 1987, 62-191694

Int. Cl.[5] H04N 5/76, 9/80

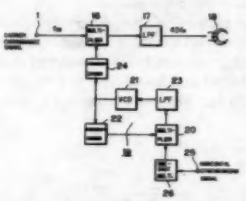
U.S. Cl. 358—310 **8 Claims**

1. A low-frequency converter for frequency-converting a carrier chrominance signal having a first frequency of a predetermined relation with respect to a horizontal synchronizing frequency into a low-frequency range in order to obtain a low-frequency conversion chrominance signal having a second frequency of a predetermined relation with respect to the horizontal synchronizing frequency, comprising:

first input means for receiving said carrier chrominance signal;

second input means for receiving a synchronizing signal wherein said synchronizing signal is synchronous with horizontal synchronizing signal having the horizontal synchronizing frequency;

frequency conversion means connected to said second input means for frequency-converting said synchronizing signal wherein the output of said frequency conversion means is a continuous wave signal having a third frequency;



a multiplier means connected to said first input means and connected directly to said frequency conversion means for multiplying said carrier chrominance signal by said continuous wave signal and outputting a multiplied signal having a frequency equal to one of the sum of and the difference between said first and third frequency; and

extracting means connected to said multiplier means for extracting said low-frequency conversion chrominance signal having said second frequency from said multiplier output signal.

4,956,720

JITTER CONTROL CIRCUIT HAVING SIGNAL DELAY DEVICE USING CMOS SUPPLY VOLTAGE CONTROL

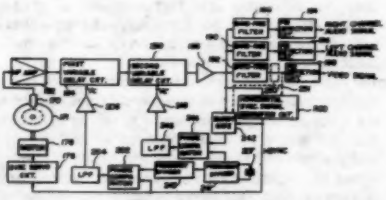
Norio Tomisawa, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Division of Ser. No. 289,479, Dec. 21, 1988, which is a continuation of Ser. No. 760,332, Jul. 29, 1985, abandoned. This application Dec. 8, 1989, Ser. No. 448,160

Claims priority, application Japan, Jul. 31, 1984, 59-160784; Jul. 31, 1984, 59-160785; Jul. 31, 1984, 59-160786; Nov. 26, 1984, 59-179551; Dec. 18, 1984, 59-267050; Dec. 21, 1984, 59-270431

Int. Cl.[5] H04N 9/89

U.S. Cl. 358—324 **5 Claims**



1. A jitter absorption circuit having a first signal delay device for absorbing jitter in a recorded signal playback device, the first signal delay device including:

CMOS gate circuit means having an input terminal to which a binary input signal to be delayed is applied, an output terminal from which a delayed signal is derived and power voltage supply terminals to which operation power

voltages from operation power voltage sources are applied; and

voltage control means connected in series in a power supplying path for said CMOS gate circuit means in associated with at least one MOS-FET of said CMOS gate circuit means for controlling voltage applied to said CMOS gate circuit means, a control signal being applied to said voltage control means for the control of the applied voltage;

the voltage applied to said CMOS gate circuit means being controlled in response to the control signal applied to said voltage control means and a period of delay in the binary input signal between said input and output terminals of said CMOS gate circuit means thereby being controlled; and wherein:

a reproduced signal from a recording medium is derived through said first signal delay device;

said jitter absorption circuit includes reproduction means for providing said reproduced signal to the first signal delay device;

said jitter absorption circuit further comprises a circuit for reproducing time axis data of said reproduced signal; and

the delay time in said first signal delay device is controlled by an output signal of said time axis data reproducing circuit in such a manner that the delay time is prolonged when the reproduced signal is ahead of a reference position in the time axis direction and the delay time is shortened when the reproduced signal is delayed from the reference position whereby jitter in the reproduced signal is absorbed.

4,956,721

METHOD OF FACSIMILE TRANSMISSION AFTER COLLECTION OF FACSIMILE CHARGE AND APPARATUS THEREFOR

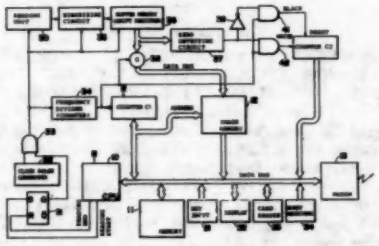
Hisashi Tasaki, and Kimikazu Endo, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 884,559, Jul. 11, 1986, abandoned. This application May 22, 1989, Ser. No. 355,825

Claims priority, application Japan, Jul. 15, 1985, 60-154067; Jul. 15, 1985, 60-154070

Int. Cl.[5] H04M *1/00*

U.S. Cl. 358—402 10 Claims



1. A facsimile transmitting method for use with a facsimile apparatus for reading and transmitting information recorded on a document, comprising the steps of:

automatically calculating a facsimile charge (i) prior to any facsimile transmission of information read from a document to be transmitted and (ii) on the basis of data relating to an amount of information recorded on said document to be transmitted;

receiving a value corresponding to the facsimile charge calculated; and

thereafter transmitting information read from the document to be transmitted.

4,956,722

IMAGE PROCESSING APPARATUS

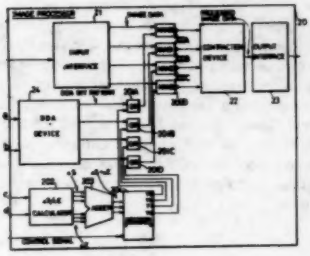
Yoichi Hamada, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 296,841, Jan. 13, 1989, abandoned, Continuation of Ser. No. 102,228, Sep. 29, 1987. This application Jan. 22, 1989, Ser. No. 369,228

Claims priority, application Japan, Sep. 30, 1986, 61-232335

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—444 15 Claims



1. An image processing apparatus of parallel processing type using DDA method for processing image data, the apparatus comprising:

input interfacee means for feeding image data to be contracted as series of predetermined number of bits;

DDA means for generating DDA bit pattern indicating valid bits in the series according to a given contraction rate;

correction means for detecting those series which are fractional as a series of predetermined number of bits, and generating correction bit pattern indicating validity of last bits of the series which are fractional as a series of predetermined number of bits;

means for producing valid bit pattern indicating valid bits in the image data as the series of predetermined number of bits, in accordance with the DDA bit pattern and the correction bit pattern; and

means for performing contraction of the image data in accordance with the valid bit pattern.

4,956,723

RECORDING APPARATUS WITH SHEET SIZE SELECTION

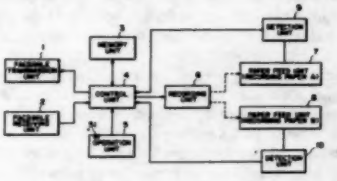
Kozo Toda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 303,060, Jan. 30, 1989, abandoned, which is a continuation of Ser. No. 156,889, Feb. 17, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 441,205

Claims priority, application Japan, Feb. 26, 1987, 62-44350

Int. Cl.[5] H04N *1/00*

U.S. Cl. 358—449 7 Claims



1. A recording apparatus comprising:

first sheet feeding means for feeding a large size of recording sheet;

first detection means for detecting the presence or absence of a sheet in said first sheet feeding means;

second sheet feeding means for feeding a small size of recording sheet;

second detection means for detecting the presence or absence of a sheet in said second sheet feeding means;

communication means for data communication;

recording means for recording image data received from said communication means or communication monitoring data; and

selection means for selecting either one of said first and second sheet feeding means, in the recording of the received image data, in accordance with size data transmitted to said communication means prior to said image data, and for selecting said second sheet feeding means in the recording of said communication monitoring data, said selection means selecting said first sheet feeding means in the recording of said communication monitoring data when said second detection means detects the absence of a sheet and said first detection means detects the presence of a sheet.

4,956,724

MULTI-CHANNEL RECORDING AND/OR REPRODUCING APPARATUS CAPABLE OF SIMULTANEOUSLY RECORDING AND/OR REPRODUCING OF TWO CHANNELS

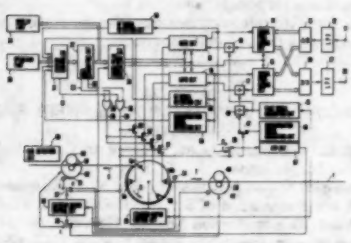
Kenichi Nagasawa, and Toshiyuki Masui, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 813,669, Dec. 26, 1985, abandoned. This application Oct. 7, 1988, Ser. No. 256,104

Claims priority, application Japan, Dec. 26, 1984, 59-276931

Int. Cl.[5] G11B *5/09*

U.S. Cl. 360—8 **23 Claims**



1. An information signal recording apparatus, comprising:

(a) input means for inputting an information signal;

(b) data sequence forming means for forming first and second data sequences in parallel with each other by performing two different sampling operations on information signal inputted by said input means at different phases and at a same frequency;

(c) first recording means for recording a first recording signal relative to said first data sequence in a first area of a tape-shaped bearing medium extending in a longitudinal direction of said medium; and

(d) second recording means for recording a second recording signal relative to said second data sequence in a second area of said medium extending in parallel with said first area on said medium.

4,956,725

IMAGE SIGNAL REPRODUCING APPARATUS

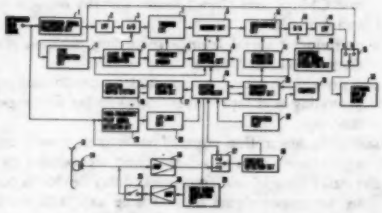
Susumu Kozuki, Tokyo; Koji Takahashi, Kanagawa; Hiroo Edakubo, Kanagawa; Tadayoshi Nakayama, Kanagawa, and Toshiyuki Masu, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1987, Ser. No. 89,674

Claims priority, application Japan, Aug. 29, 1986, 61-201365; Nov. 21, 1986, 61-276832

Int. Cl.[5] G11B *27/02*

U.S. Cl. 360—14.3 **19 Claims**



1. An image signal reproducing apparatus for reproducing an image signal from a recording medium on which the image signal and an index signal indicating a desired position on the recording medium have been recorded, comprising:

(A) reproducing means for reproducing the image signal from said recording medium on which said image signal has been recorded;

(B) extracting means for detecting the index signal recorded on said recording medium and for extracting a representative image signal of one image plane corresponding to the detected index signal from the image signal reproduced by said reproducing means;

(C) position information signal generating means for generating a position information signal corresponding to a position on said recording medium where the representative image signal extracted by said extracting means has been recorded; and

(D) output means for outputting the representative image signal extracted by said extracting means and the position information signal generated by said position information signal generating means.

4,956,726

INFORMATION SIGNAL REPRODUCING APPARATUS IN WHICH CONTROL SIGNAL CONDITION AND INFORMATION SIGNAL LEVEL ARE VARIED SO AS TO CORRESPOND

Hiroyuki Takimoto; Yutaka Kohtani, both of Yokohama, and Yoshiyuki Saitoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 27,097, Mar. 13, 1987, abandoned, which is a continuation of Ser. No. 503,636, Jun. 13, 1983, abandoned. This application Dec. 1, 1988, Ser. No. 279,318

Claims priority, application Japan, Jun. 14, 1982, 57-102591

Int. Cl.[5] G11B *5/02*

U.S. Cl. 360—27 **15 Claims**

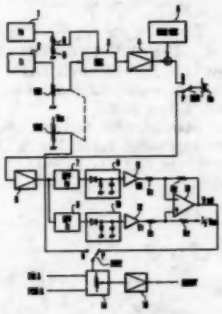
1. An information signal reproducing apparatus, comprising:

(a) first reproducing means for reproducing an information signal recorded in a first area extending longitudinally on a tape-shaped recording medium;

(b) second reproducing means for reproducing a control signal recorded in a second area parallel with said first area on the tape-shaped recording medium;

(c) control means for variably controlling a level of the information signal reproduced by said first reproducing means based on a state of the control signal reproduced by said second reproducing means;

(d) recording means for recording said control signal in the second area;
(e) first selecting means for variably setting the level of the information signal reproduced by said first reproduced means by manual operation;
(f) second setting means for variably setting the state of said control signal being recorded by said recording means;
(g) interlocking means for interlocking said first and second setting means so that the state of said control signal corresponds to the level of the information signal reproduced; and
(h) mode setting means for setting a mode of the apparatus between a plurality of modes, the plurality of modes including a first mode, and a second mode, when the appara-



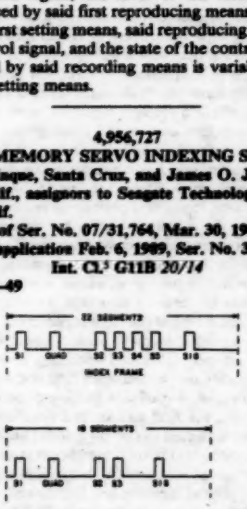
tus is in said first mode, said first corresponding means reproduces the information signal, said second reproducing means reproduces the control signal, and the level of the information signal reproduced by said first reproducing means is controlled by said control means based on the state of the control signal reproduced by said second reproducing means, and when the apparatus is in said second mode said first reproducing means reproduces the information signal, the level of the information signal reproduced by said first reproducing means is variably set by said first setting means, said reproducing means records the control signal, and the state of the control signal being recorded by said recording means is variably set by said second setting means.

4,956,727

DISC MEMORY SERVO INDEXING SYSTEM

David J. Bezinque, Santa Cruz, and James O. Jacques, Aptos, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Continuation of Ser. No. 07/31,764, Mar. 30, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 308,931
Int. Cl.[5] G11B *20/14*
U.S. Cl. 360—49 13 Claims



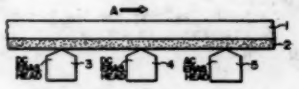
1. A servo disc in a magnetic disc drive comprising a plurality of data tracks and guard bands, each track and guard band including a plurality of frames, each frame including first pulse groups of at least one sync pulse which is used to generate a first track alignment signal (Quad) and second sync pulse groups of at least one sync pulse which is used to generate a second track alignment signal (Sig) and Index signal wherein said Sig and Index signal is generated by identifying different pulses patterns of said second sync pulse group, and wherein track identification is provided by selectively eliminating sync pulses in said second sync pulse group in a plurality of frames.

4,956,728

METHOD OF AND DEVICE FOR DEMAGNETIZING MAGNETIC RECORDING MEDIUM

Youichi Hayata, and Michihiro Matsui, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 755,305, Jul. 12, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 931,944
Claims priority, application Japan, Jul. 16, 1984, 59-147103
Int. Cl.[5] G11B *5/03*
U.S. Cl. 360—66 3 Claims



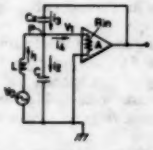
1. A method of demagnetizing a magnetic recording medium, comprising the steps of:
moving said magnetic recording medium in one direction;
applying a saturating magnetic field to said magnetic recording medium, said saturating magnetic field producing a residual flux density with a first polarity in said magnetic recording medium;
after the step of applying a saturating magnetic field, applying an unsaturating magnetic field to said magnetic recording medium in a direction opposite to the direction of said saturating magnetic field, said unsaturating magnetic field producing a residual flux density with a second polarity in said magnetic recording medium, said second polarity being opposite to said first polarity; and
after the step of applying an unsaturating magnetic field, applying an alternating magnetic field to said magnetic recording medium to remove residual magnetism which has been left on the magnetic recording medium by said unsaturating magnetic field.

4,956,729

VIDEO SIGNAL PREAMPLIFIER CIRCUIT

Tomishige Yatsugi; Hiroshi Tooda; Tadashi Takamiya; Norio Minami, and Isao Fukushima, all of Iharaki, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Ltd., Kanagawa, both of, Japan

Filed Oct. 20, 1987, Ser. No. 110,424
Claims priority, application Japan, Oct. 20, 1986, 61-247407; Feb. 14, 1987, 61-30664
Int. Cl.[5] G11B *5/02, 15/14*
U.S. Cl. 360—67 2 Claims



1. A preamplifier circuit for amplifying a video signal repro-

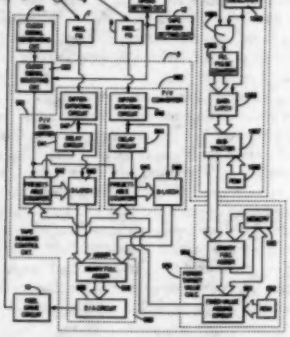
duced by a magnetic head comprising an amplifier circuit having an input terminal connected to said magnetic head and an output terminal, wherein said preamplifier circuit further comprises a positive feedback circuit including a capacitive impedance provided between said input terminal of said amplifier circuit and said output terminal of said amplifier circuit, whereby a capacitance component of an input impedance of said amplifier circuit, including a stray capacitance of said magnetic head, is at least reduced by a positive feedback provided by said positive feedback circuit, and further comprising a negative feedback circuit including a resistive impedance and wherein said amplifier circuit includes an inverted output terminal, said negative feedback circuit being connected between said input terminal and said inverted output terminal of said amplifier circuit.

4,956,730

APPARATUS HAVING A HIGH-SPEED SEARCH CAPABILITY FOR REPRODUCING SIGNALS RECORDED ON A TAPE

Kazuo Arai, Hirakata, and Kiyoshi Ota, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 21, 1987, Ser. No. 76,188
Int. Cl.[5] G11B *5/53, 15/467*
U.S. Cl. 360—70 **8 Claims**



5. An apparatus for reproducing signals recorded in slanting tracks on a recording tape including a tape position information recorded at a specified area on each track, comprising:

a rotary cylinder having a reproducing head mounted thereon;

a cylinder rotation detector for producing a periodic output signal corresponding to a rotational speed of said rotary cylinder;

two reels on which said tape is wound;

two reel rotation detectors for respectively producing periodic output signals corresponding to rotational speeds of said two reels;

a signal processing circuit for processing signals picked up by said head from said tape;

a reel drive means for driving either one of said two reels so as to run said tape;

a tape speed setting means for selectively setting a plurality of tape speeds and for outputting a signal indicative of one of said plurality of tape speeds;

a period target value calculating means for producing a period target value from an output signal from said signal processing circuit;

a tape running control means for outputting a drive signal to said reel drive means according to said period target value, said output signals from said two reel rotation detectors and said output signal from said tape speed setting means so that said tape runs at a speed which is modified from the speed set by said tape speed setting means according to said period target value;

a cylinder speed setting means for setting a rotational speed of said rotary cylinder such that a track direction speed component of said head is kept constant according to said output signal from said tape speed setting means and for outputting an output signal indicative of the set rotational speed; and

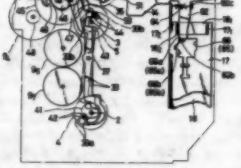
a cylinder control means for controlling said rotary cylinder according to said output signal from said cylinder rotation detector and said output signal from said cylinder speed setting means so that said rotary cylinder rotates at the speed set by said cylinder speed setting means.

4,956,731

TAPE FEEDING DIRECTION CONTROLLING DEVICE FOR AUTOMATIC REVERSING TAPE RECORDER

Toshio Yoshimura, Kawasaki, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 326,002
Claims priority, application Japan, Jun. 2, 1988, 63-73479[U]
Int. Cl.[5] G11B *15/00*
U.S. Cl. 360—96.3 **4 Claims**



1. A tape feeding direction controlling device for an automatic reversing tape recorder which includes a tape feeding mechanism for alternatively feeding a tape at a normal or a high speed in a first or a second direction and an automatic reversing mechanism which operates when a tape is fed to its last end, comprising a feeding direction controlling member movable between first and second positions for determining a tape feeding direction in which a tape is to be fed by said tape feeding mechanism, said feeding direction controlling member being alternatively moved from the first to the second position or from the second to the first position in response to operation of said automatic reversing mechanism to reverse the tape feeding direction, first and second high speed operating members provided for individual manual operation, a high speed change-over member having a neutral position and first and second positions for causing said tape feeding mechanism to alternatively feed a tape at the high speed in the first or second direction, and a pivotal member positioned for engagement by said first and second high speed operating members and connected to be bodily moved between first and second positions in response to movement of said feeding direction controlling member between the first and second positions, said pivotal member being connected to said high speed change-over member such that, when said pivotal member is at the first position, manual operation of said first high speed operating member will pivot said pivotal member in a first direction to move said high speed change-over member from the neutral position to the first position, but manual operation of said second high speed operating member will pivot said pivotal member in the opposite second direction to move said high speed change-over member from the neutral position to the second position,

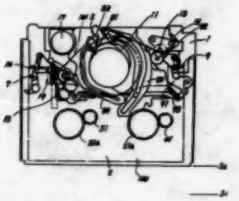
and when said pivotal member is at the second position, manual operation of said second high speed operating member will pivot said pivotal member in the first direction to move said high speed change-over member to the first position, but manual operation of said first high speed operating member will pivot said pivotal member in the second direction to move said high speed change-over member to the second position.

4,956,732

DEVICE FOR CONTINUOUSLY DRIVING A TAPE REEL SUPPORT AS A TAPE IS UNLOADED

Masahiro Moriyama, Daito, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Feb. 17, 1989, Ser. No. 310,975
Claims priority, application Japan, Feb. 19, 1988, 63-38288
Int. Cl.[5] G11B *15/32, 15/44*
U.S. Cl. 360—96.3 6 Claims



1. A reel support drive device including a main chassis provided with a head cylinder and a capstan motor, a reel chassis slidably mounted on the main chassis and provided with a pair of reel supports, the reel chassis being movable between an eject mode projected from the main chassis and a play mode positioned close to the head cylinder for loading a tape, and a swing idler mechanism provided on the main chassis and coupled to the capstan motor, the idler mechanism being selectively alternatively engageable with one of the two reel supports on the reel chassis to drivingly rotate the reel support, wherein the improvement comprises:

a gear mechanism mounted on the reel chassis and coupled to one of the reel supports,

the idler mechanism includes a lever supported by a pivot and swingable with a change in the direction of rotation of the capstan motor, a fixedly positioned gear supported concentrically with said pivot supporting the lever, and an idle gear supported on the free end of the lever and coupled to the fixedly positioned gear at all times,

the fixedly positioned gear being coupled to the capstan motor by rotation transmitting means, and

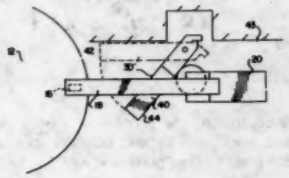
said gear mechanism includes at least three gears, at least two of the gears of the gear mechanism being rotatable in the same direction and arranged along the sliding direction of the reel chassis so as to mesh one after another with the idle gear during their movement during sliding movement of the reel chassis, the other at least one gear of the gear mechanism being so positioned as not to mesh with the idle gear, whereby the rotation of the capstan motor is transmitted to said one reel support during the sliding movement of the reel chassis.

4,956,733

STORAGE MEDIA TRANSDUCER LOADING/UNLOADING AND CARRIAGE LOCK MECHANISM

Warren L. Dalziel, Monte Sereno, Calif., assignor to Tandon Corporation, Moorpark, Calif.

Division of Ser. No. 159,709, Feb. 24, 1988, Pat. No. 4,804,261, which is a continuation-in-part of Ser. No. 759,980, Jul. 25, 1985, abandoned. This application Jun. 8, 1989, Ser. No. 363,651
Int. Cl.[5] G11B *5/54*
U.S. Cl. 360—105 3 Claims



1. A removable, portable rigid disk drive module for use in a microcomputer system, the module being comprised of an enclosure adapted to be removably installed in a microcomputer system and a disk storage system within the enclosure, the disk storage system including at least one rigid magnetic disk, said at least one disk having opposed surfaces, a cantilevered beam mounted adjacent each surface of said at least one disk, a magnetic transducer mounted on each cantilevered beam, each cantilevered beam normally disposing the associated transducer in a loaded position proximate the associated surface of said at least one disk, and means for moving the cantilevered beams away from the associated surfaces of said at least one disk to place the associated transducers in an unloaded position away from the associated surfaces of said at least one disk, the means for moving the cantilevered beams including a pivotable separator element normally assuming a first position spaced-apart from the cantilevered beams and means for selectively moving the separator element into a second position in which the separator element engages the cantilevered beams to move the cantilevered beams away from their associated disk surfaces to place the transducers in the unloaded position, the means for moving the cantilevered beams further including resilient means coupled to the separator element, means for latching the separator element in the first position and means associated with the latching means for momentarily unlatching the separator element in response to an external command to allow the resilient means to move the separator element from the first position to the second position.

4,956,734

MODE CHANGEOVER MECHANISM FOR TAPE RECORDERS

Masao Kamijo, Tokyo, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Jun. 20, 1989, Ser. No. 368,861
Claims priority, application Japan, Aug. 10, 1988, 63-198046
Int. Cl.[5] G11B *5/54, 21/12*
U.S. Cl. 360—105 2 Claims

1. A mode changeover mechanism for tape recorders comprising in combination:

a motor rotatable in opposite directions,

a capstan gear rotatable in unison with a capstan shaft by said motor,

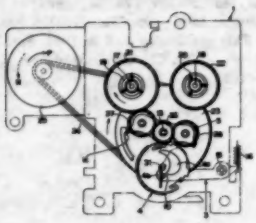
a gear arm provided such that it is rotatable in the direction of rotation of said capstan shaft,

two gears rotatably supported on said gear arm such that they are always in mesh with said capstan shaft to selectively drive a supply reel or a take-up reel,

an assist gear having a toothless segment and whose engage-

ment with said capstan gear is controlled by the turning of said gear arm,

an eccentric cam and a changeover cam formed on said assist gear, and



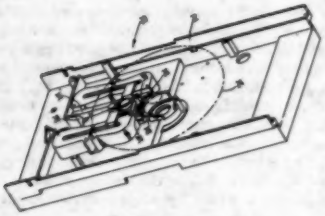
means for controlling the position of a head plate to slide forth said head plate by said eccentric cam and change said head plate to the "playback" or "fast forward" position.

4,956,735

ACTUATOR MAGNETIC CIRCUIT

Wayne E. Foote, Eagle, and Richard L. Swantner, Meridian, both of Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 8, 1989, Ser. No. 349,469
Int. Cl.[5] G11B *21/08*
U.S. Cl. 360—106 **2 Claims**



1. Magnetic circuit structure for use in an actuator, said actuator having a displaceable assembly and a coil attached to said assembly, said magnetic circuit comprising:

a first pair of flux conductors, each flux conductor having generally parallel first and second poles defining a first gap therebetween and each having an integrally formed base joining one end of said first and second poles, wherein each of said flux conductors defines a continuous flux path, said first and said second poles being of predetermined thickness, said base of each said flux conductors being of greater thickness than said predetermined thickness of said first and second poles, said flux conductors being arranged such that the free ends of said first and second poles are facing so that the first gaps associated with each of said flux conductors are aligned; and

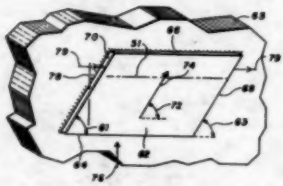
a first pair of magnets, each magnet being attached to one of said first poles in said first gap so that flux generated by each magnet is directed across said first gap, wherein a portion of said coil passes through said first gap.

4,956,736

THIN FILM MAGNETIC ELEMENT HAVING A RHOMBIC SHAPE

Neil Smith, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 16, 1988, Ser. No. 285,178
Int. Cl.[5] G11B *5/39*; G01R *33/02*; B32B *15/00*
U.S. Cl. 360—113 **3 Claims**



1. An improved magnetoresistive reproduce head for playback of magnetically recorded information from a magnetic medium, the improvement comprising:

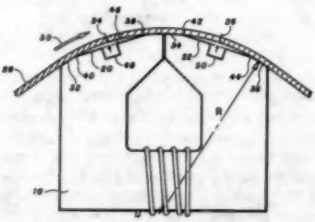
a. a magnetoresistive thin film element deposited on a nonmagnetic substrate, said element being geometrically shaped as a rhomboid, whereby the magnetization of said single domain magnetoresistive element is stabilized against noise inducing domain wall formation.

4,956,737

MAGNETIC HEAD CONTOUR UTILIZING FACETS FOR AIR FILM SKIVING

George W. Brock, La Jolla, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 4, 1989, Ser. No. 332,829
Int. Cl.[5] G11B *5/187*
U.S. Cl. 360—122 **6 Claims**



1. An improved magnetic head comprising:

a. an arcuate surface segment having a contour adapted for contacting a flexible magnetic tape,

b. at least one facet in said contour wherein first and second edges of said facet are discontinuities in said arcuate contour, whereby said first and said second edges are adapted for skiving entrained air from said tape, and

c. at least one slot in said facet, whereby said slot is an escape channel for said air.

4,956,738

VERY HIGH SPEED CIRCUIT BREAKER ASSISTED BY SEMICONDUCTORS

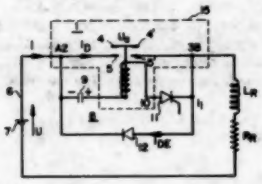
Georges Defosse, Barchon; Henri Bonhomme, Ans, and Rene Lesceux, Alleur, all of Belgium, assignors to (ACEC) Ateliers De Constructions Electriques De Charleroi, Brussels, Belgium

Filed Oct. 8, 1985, Ser. No. 785,398

Claims priority, application European Pat. Off., Oct. 12, 1984, 84201469.8

Int. Cl.[5] H02H 7/22

U.S. Cl. 361—8 14 Claims



1. A circuit breaker connected in a principal circuit via an inlet terminal and an outlet terminal, comprising:

means for forming a mobile contact bridge between the inlet and outlet terminals,

means, connected to said mobile contact bridge means, for magnetically holding said mobile contact bridge means in contact with the inlet and outlet terminals; and

an auxiliary circuit connected across the inlet and outlet terminals and responsive to a defect current in the principal circuit for generating a surge of current opposing the defect current and for simultaneously applying an electrodynamic force to said mobile contact bridge means to overcome the magnetic hold and simultaneously separate said contact bridge means from the inlet and outlet terminals whereby a very fast circuit break in the principal circuit is formed.

4,956,739

DEVICE FOR LOCATING INTERNAL FAULTS IN A HIGH-VOLTAGE CAPACITOR BATTERY

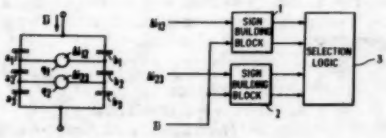
Michael Becker, and Klaus Renz, both of Uttenreuth, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 27, 1989, Ser. No. 372,273

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1988, 3821944

Int. Cl.[5] H02H 7/16

U.S. Cl. 361—16 3 Claims



1. A device for determining internal faults in a high-voltage capacitor battery that has a plurality of symmetrically parallel and series-coupled capacitor banks arranged in parallel branches coupled by shunt branches such that shunt currents flow between the parallel branches each of said capacitor banks having a plurality of parallel and series-coupled capacitor windings and associated internal fuses, comprising:

means for determining phase angles of shunt currents flowing between parallel branches relative to a total current flowing through the parallel branches; and

means for determining a faulty capacitor bank from said determined phase angles.

4,956,740

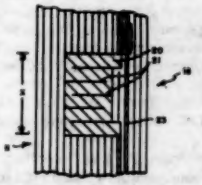
PROTECTION TECHNIQUE FOR SUPERCONDUCTING MAGNETS

John E. C. Williams, Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 4, 1987, Ser. No. 81,645

Int. Cl.[5] H02H 7/10

U.S. Cl. 361—19 6 Claims



1. An electrical resistance device for use in a superconducting magnet having at least one superconducting winding, said device including

a resistance element positioned in thermal contact with at least a portion of a winding of said magnet; and

a superconducting gate element in series with said resistance element and positioned in thermal contact with said magnet winding relatively close to, but not in thermal contact with, said resistance element, said gate element capable of being switched from its superconducting state to its normal resistance state to limit current in said device so as to protect said resistance element and the portion of the winding with which it is in thermal contact.

4,956,741

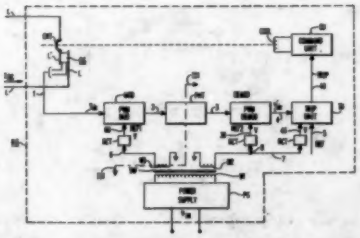
SOLID-STATE TRIP UNIT FOR DC CIRCUIT BREAKERS

William J. Murphy, and Joseph C. Engel, both of Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 3, 1989, Ser. No. 375,301

Int. Cl.[5] H02H 3/08

U.S. Cl. 361—95 6 Claims



1. In a circuit breaker having a housing, within the housing coil-actuated contacts connected to an electrical line for protection of a load supplied by said line;

the housing containing at least one line current sensor for outputting a voltage signal representative of the current flowing in the line and solid state trip unit means responsive to said voltage signal for actuating said coil to trip the circuit breaker when the voltage signal exceeds a predetermined reference level;

a power supply being provided for supplying an operative DC voltage for said trip unit means;

the combination of:

means for pulse-width modulating said sensor voltage signal to derive a pulse-width modulated signal representative thereof;

photo-coupling means responsive to said pulse-width modulated representative signal for outputting a pulse-width modulated translated signal;

means for converting said translated signal into a second voltage signal as an input signal for said trip unit means;

the power supply including means responsive to a DC voltage source for generating in relation to said DC voltage a square-wave voltage of predetermined frequency;

a transformer having primary winding means responsive to said square-wave voltage and secondary winding means responsive thereto for outputting a square-wave current;

said modulating means including first rectifier means responsive to said square-wave current for establishing a second DC voltage operative with said modulating means;

said converting means including second rectifier means responsive to said first square-wave current for establishing a third DC voltage operative with said converting means;

said transformer primary and secondary winding means providing in combination with said photo-coupling means electrical isolation for said current sensor from said power supply and said tripping unit means within the housing; and

said secondary windings means being effective to translate any variation in the magnitude of said square-wave voltage into a related change in magnitude of said second and third operative DC voltages, and said converting means being effective through said third operative DC voltage to automatically compensate for such magnitude variation, whereby said second voltage signal is a faithful translation of said sensor voltage signal.

4,956,742

SWITCH GEAR

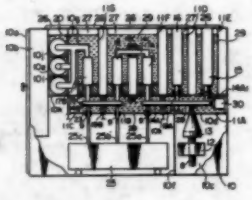
Kunihiko Takagi, Tama; Masazumi Shiraishi, Hachioji, and Ken-ichi Sato, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 3, 1989, Ser. No. 388,857

Claims priority, application Japan, Aug. 11, 1988, 63-198955; Sep. 26, 1988, 63-238817; Jan. 23, 1989, 1-011894

Int. Cl.[5] H02B *1/04*

U.S. Cl. 361—131 **8 Claims**



1. A switch gear comprising: a box structure constituting a case; items of electrical equipment including disconnecting means and circuit-breaking means installed within said box structure; connecting conductors for connecting said electrical equipment items; operating mechanisms for operating said disconnecting means and said circuit-breaking means installed within said box structure; connecting conductors for connecting said electrical equipment items; operating mechanisms for operating said disconnecting means and said circuit-breaking means; partition walls for partitioning the interior of the box structure into compartments for accommodating said operating mechanisms and compartments for accommodating the electrical equipment items; and masses of a silicone gel filling said compartments accommodating the electrical equipment items, the interior of each of said compartments for accommodating said electrical equipment items being filled with said silicone gel up to a specific height level, an empty space being left at an upper part of each of said interior above the silicone gel.

4,956,743

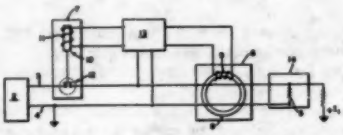
GROUND FAULT INTERRUPTERS FOR GLASSY METAL ALLOYS

Ryusuke Hasegawa, Morristown, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 323,120, Mar. 13, 1989, abandoned, which is a continuation of Ser. No. 180,663, Mar. 30, 1988, abandoned, which is a continuation of Ser. No. 817,208, Jan. 8, 1986, abandoned. This application Jan. 19, 1990, Ser. No. 465,658

Int. Cl.[5] H02H *3/16*

U.S. Cl. 361—45 **20 Claims**



1. A ground fault interrupter comprising:

a. first means for receiving from a current source and passing to an electrical load a current;

b. second means for receiving from the electrical load and passing to the current source a current;

c. detection means associated with the first and second means for detecting a ground fault current, said detection means having a core composed of a metal alloy which is at least about 90% glassy and which consists essentially of a composition having the formula $Co_aFe_bNi_cM_dB_eSi_f$ where M is at least one member selected from the group consisting of Cr, Mo, Mn and Nb, a-f are in atom percent, the sum (a+b+c+d+e+f) is equal to 100, "a" ranges from about 66 to 71, "b" ranges from about 2.5 to 4.5, "c" ranges from about 0 to 3, "d" ranges from about 0 to 2 except when M=m in which case "d" ranges from about 0 to 4, "e" ranges from about 6 to 24 and "f" ranges from about 0 to 19, with the proviso that the sum of "a", "b" and "c" ranges from about 72 to 76 and the sum of "e" and "f" ranges from about 25 to 27, said alloy having the form of a ribbon and having been heat-treated to induce therein Perminvar-like characteristics wherein said core has a constricted B-H loop having a relatively constant permeability near zero field excitation an a high permeability above a preselected threshold field; and,

d. interruption means associated with said first means operative in response to a signal from said detection means for interrupting the passage of current.

4,956,744

MULTILAYER CAPACITOR

Cornelis W. Berghout, and Hendrikus J. J. M. Van Hares, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1989, Ser. No. 319,005

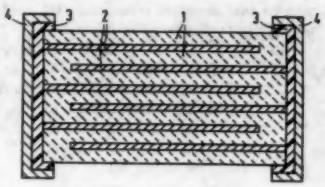
Claims priority, application Netherlands, Mar. 7, 1988, 8800559; Jan. 13, 1989, 8900079

Int. Cl.[5] H01G *4/10, 7/00*

U.S. Cl. 361—321 **6 Claims**

5. A multilayer capacitor comprising alternate layers of a dielectric oxide material and an electrode material which consists predominantly of palladium, the capacitor having metallic

end contacts which end contacts electrically connectively contact a prescribed part of the layers of electrode material and



which end contacts contain silver and wherein the electrode material comprises a glass composition comprising lead oxide.

4,956,745

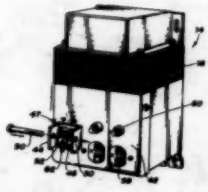
TRANSFORMER ASSEMBLY WITH EXPOSED LAMINATIONS AND HOLLOW HOUSINGS

Peter H. Burgher, Captiva, Fla.; Richard L. Holmes, Lansing, and John Boomer, Howell, both of Mich., assignors to Marelco Power Systems, Inc., Howell, Mich.

Filed May 10, 1989, Ser. No. 349,705

Int. Cl.[5] H05K 7/20

U.S. Cl. 361—383 **19 Claims**



1. A transformer assembly for providing a source of auxiliary electrical power independent of a main power supply, the transformer assembly comprising:

a transformer having a core including a first side and a second side opposite thereto, and a coil including a first portion protruding outwardly from the first side of the core and a second portion protruding outwardly from the second side of the core, the core including corners and lateral side edges, said corners and edges extending between the first and second sides for facilitating the removal of heat generated by the transformer from said corners and edges by ambient air to which said corners and edges are exposed, so that heat can be removed therefrom;

a first hollow housing attached to the first side of the core and extending over the first portion of the coil; and

a second hollow housing attached to the second side of the core and extending over the second portion of the coil.

4,956,746

STACKED WAFER ELECTRONIC PACKAGE

Louis E. Gates, Jr., Westlake Village, and Charles A. Finaila, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 29, 1989, Ser. No. 329,991

Int. Cl.[5] H05K 7/20

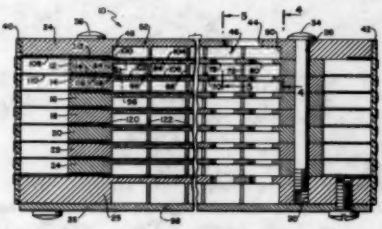
U.S. Cl. 361—385 **21 Claims**

1. An electronic package comprising:

at least first and second support plates and a bottom support plate, each of said support plates having a support surface thereon, a semiconductor wafer directly supported on said support surface of each of said support plates, each of said support plates having a plenum formed therein, said first and second support plates and said bottom support plate being stacked so that said first support plate is on tope of said second support plate so that said plenum of said first support plate directly faces said support surface of said second support plate;

a top plate engaging on and covering said first support plate and a bottom plate beneath and covering the bottom of said bottom support plate, said top plate, said support plates and said bottom plate being stacked;

a plurality of webs formed in each of said plenums so that aid webs extend toward the support surface of the facing support plate to lie closely adjacent said semiconductor



wafer supported on said facing support surface, a resilient adhesive between said webs and said semiconductor wafer so that said semiconductor wafer is supported by said webs on the side of said semiconductor wafer away from said support surface and said webs and said adhesive enclose channels through each plenum over said semiconductor wafers;

a fluid opening in said bottom plate, a fluid opening in said top plate, said plenums being arranged so that fluid entering one of said openings passes through said plenums to the other of said openings so that said wafers on said support surfaces are directly in contact with fluid and are cooled by fluid passing through said plenums.

4,956,747

MULTIPLE SIGNAL TRANSMISSION DEVICE

Dieter Beer, Mösbach/Feldkahl; Horst Reddehase, Detmold; Siegfried Kerbstat, Detmold; Detlef Hanning, Augustdorf; Ulrich Plass, and Hermann Krause, both of Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,128

Claims priority, application European Pat. Off., Oct. 18, 1988, 88117313

Int. Cl.[5] H05K 7/00

U.S. Cl. 361—392 **10 Claims**

1. A multiple signal transmission device for controlling equipment, comprising

(a) a transmitter/receiver connected with a carrier rail;

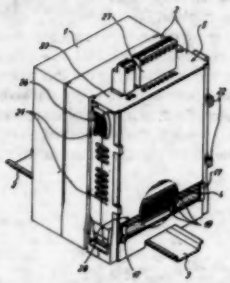
(b) at least one input/output module connected with said transmitter/receiver for transferring control signals relative to the equipment, said module including

(1) a bottom portion connected with the carrier rail; and

(2) a top portion electrically connected with said bottom portion via a plug connecting;

(c) contact means connected with said module bottom portion and protruding laterally outwardly therefrom for engaging and electrically connecting said module bottom portion with a bottom portion of an adjacent module to

provide current to said modules and data transfer therebetween, said contact means being electrically connected



with said plug connection to supply current and transfer data relative to said module top portion.

4,956,748

WIRING APPARATUS FOR AUTOMOBILE

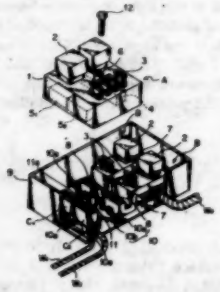
Masaki Yamamoto; Hideharu Hayashi, and Yukio Murasmatsu, all of Kosai, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Continuation of Ser. No. 308,217, Feb. 9, 1989, abandoned. This application Feb. 9, 1990, Ser. No. 477,154

Claims priority, application Japan, Feb. 10, 1988, 63-15687

Int. Cl.[5] H01R *13/514*

U.S. Cl. 361—394 **1 Claim**



1. A wiring apparatus for an automobile comprising:

a housing (9) having a flat bottom, a projection (11) upwardly projecting from the bottom and being formed with a female thread therein, and a plurality of resilient clamping straps (10*b*), said projection and clamping straps being integrally formed with the bottom;

at least one terminal connector (C) clamped to said bottom by means of said clamping straps, said terminal connector (C) having a wire harness connected to other electrical circuits in said automobile;

at least one option-circuit block (B) having a first body clamped to the bottom by means of said clamping straps, said first body having on a topside thereof an optional circuit specific to models and classes of automobiles and on an underside thereof a space through which a wire harness extends to other electrical circuits in said automobile, said first body having a first connector (8) integrally formed therewith and remote from said option-circuit; and

a basic-circuit block A having a second body, said second body having on a topside thereof a basic electrical circuit common to the models and classes of the automobiles, said second body having on an underside thereof at least one second connector (4) matingly connected to said first connector (8) and at least one third connector (5) matingly connected to said terminal connector (C), said second body having a hole therein, wherein

said basic-circuit block A is mated with said option-circuit block B and said terminal connectors and then secured to said bottom by means of a bolt which passes through the hole and is threaded into said female thread, thereby simultaneously establishing both mechanical and electrical connection between said option-circuit block B and between said terminal connector (C).

4,956,749

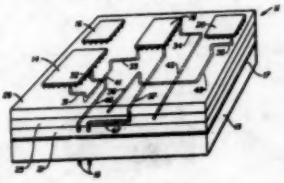
INTERCONNECT STRUCTURE FOR INTEGRATED CIRCUITS

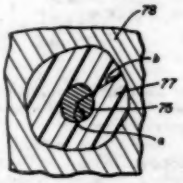
Cheng-Cheng Chang, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 20, 1987, Ser. No. 123,488

Int. Cl.[5] H05K *7/20*

U.S. Cl. 361—414 **16 Claims**





1. An interconnection structure for semiconductor integrated circuits comprising,

a substrate having a plurality of electrical terminal members therein,

an electrically conductive metal block disposed over the substrate with a component mounting surface, the metal block containing an electrically conductive wire interconnection pattern, insulated from the metal block, extending from the plurality of electrical terminal members associated with the substrate to the component mounting surface of the block, and

a plurality of semiconductor integrated circuits joined to the wire interconnection pattern at the mounting surface.

4,956,750

REGISTER RACK ASSEMBLY FOR A PROGRAMMABLE CONTROLLER SYSTEM

John Maggelet, Sussex, Wis., assignor to Square D Company, Palatine, Ill.

Filed Mar. 17, 1989, Ser. No. 325,414

Int. Cl.[5] H05K *7/14*

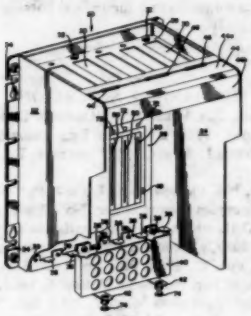
U.S. Cl. 361—415 **9 Claims**

1. A register rack assembly housing a plurality of electronic modules including a programmable controller and related

devices, each of said electronic modules containing an electronic circuit board, said register rack assembly comprising:

a rear wall, a pair of spaced side walls and a top wall;

a mounting member extending between said side walls and mounted at a lower end of said rear wall, said mounting member having spaced tabs defining positioning slots for receiving a complementary mounting tab forming part of each said electronic modules;



a latch member disposed between said side walls and mounted thereto adjacent respective upper forward edges thereof, said latch member including means for pivoting said latch member relative to said side walls; and

means associated with said latch member for locking said latch member in a closed position in engagement with an abutment on said electronic modules, said latch member retaining said modules in said register rack assembly.

4,956,751

ILLUMINATION EQUIPMENT

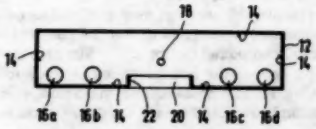
Tetsuhiro Kano, Lobenhofferstrasse 49, 8600 Bamberg, Fed. Rep. of Germany

Filed Jun. 12, 1989, Ser. No. 365,930

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820576

Int. Cl.[5] F21V *9/00*

U.S. Cl. 362—1 **5 Claims**



1. Illumination equipment for producing light closely resembling natural daylight, comprising:

a housing having a reflective inner surface, an upper wall and an opening oppositely disposed from said upper wall;

at least one light source radiating substantially in the blue-green region of the light spectrum positioned at a location within said housing at which radiation therefrom can exit from said opening only after having been reflected at least once from the reflective inner surface of said housing; and

at least one light source radiating substantially in the red-orange-yellow region of the light spectrum positioned within said housing at a location at which a portion of the radiation therefrom exits directly from said opening without having been reflected from the reflective surface of the housing and a portion of the radiation therefrom is blended by reflection on the reflective inner surface of said housing with radiation from said at least one blue-green light source prior to exiting from said opening, whereby the light radiated from said opening is composed, at each radiation angle, of components which originate from said at least one blue-green light source and from said at least red-orange-yellow light source.

4,956,752

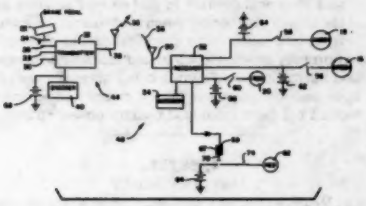
CYCLOPS LIGHTED MOTORCYCLE HELMET

Joe Foglietti, 3120 East Blvd., #C, Bethlehem, Pa. 18017

Filed Dec. 28, 1988, Ser. No. 291,169

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—72 **2 Claims**



1. A safety helmet, wearable by an operator of a motorcycle having a brake pedal, comprising:

(A) a protective helmet having a rear portion;

(B) a multicolored light source mounted on said helmet at said rear portion, and including a green light, an amber light and a red light;

(C) a plurality of switches, each switch of said plurality of switches being associated with one colored light of said multicolored lights source and adapted to actuate said one colored light;

(D) switch control means for operating said switches as the brake pedal is operated to activate each colored light as the brake pedal is operated, with said green light being associated with an untouched brake pedal with the motorcycle in a normal forward speed mode, said amber light being associated with a gently depressed brake pedal and said red light being associated with a hard braking action, said switch control means including

(1) a transmitter attached to the motorcycle brake pedal and adapted to transmit a signal that is associated with the movement of the brake pedal as that brake pedal is operated so that different signals are transmitted as the brake pedal is untouched, depressed gently and depressed in a hard braking action,

(2) a receiver located inside said protective helmet and which is adapted to receive signals transmitted by said transmitter,

(3) a motorcycle electrical power source associated with each colored light of said multicolored lights and connected to said receiver and to the switch associated with the associated colored lights by the switches of said switch means so that each colored light of said multicolored lights is activated sequentially as the brake pedal is untouched, depressed gently and depressed in a hard braking action to be green, then to go amber and then red as said brake pedal is moved from a non-brake activating position in a normal cruising mode to a hard braking position; and

(E) loss of power signal circuit means which includes

(1) a second red light,

(2) a backup power source,

(3) a first line conductor connected to said backup power source,

(4) a second line conductor connected to said second red light,

(5) a normally open switch connecting said backup power

source to said second red light when closed, said normally open switch including

(a) an electrical contact with electrically connects said first line conductor to said second line conductor and which is movable from a first position contacting both of said first and second line conductors to a second position spaced from both of said first and second line conductors,

(b) a solenoid connected to said motorcycle electrical power source and attached to said electrical contact to move said electrical contact between said first and said second positions,

(c) a spring biasing said solenoid to move said electrical contact into said first position, said soleniod holding said electrical contact in said second position against the bias of said spring when said soleniod is energized from said motorcycle electrical power source,

(6) a normally closed switch in said second line conductor, said normally closed switch being manually operable to open said loss of power circuit means and separate said second red light from said backup power source.

4,956,753

LAMP ASSEMBLY

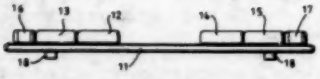
Andrew B. Renfrew, Sutton Coldfield, United Kingdom, assignor to Lucas Industries, plc, Birmingham, England

Filed Nov. 5, 1987, Ser. No. 116,835

Claims priority, application United Kingdom, Nov. 5, 1986, 8626437

Int. Cl.[5] B60Q *1/52*

U.S. Cl. 362—74 20 Claims



1. A lamp assembly comprising an elongate support member having a hollow cross section, and a plurality of lamp units secured to said support member at positions spaced along the length of said support member, electrical connecting leads of said lamp units being disposed in the hollow interior of said support member, said lamp units each comprising a body housing a lighting assembly of the unit and having opposite ends, and closure members closing said opposite ends, at least one of said closure members being transparent, said closure members of all of said lamp units of the assembly being of similar shape, and said lamp unit bodies having the same cross-sectional shape.

4,956,754

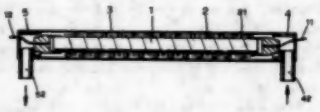
ULTRAVIOLET LAMP ASSEMBLY

Sen-Lung Chen, No. 371, Min-Tzu Road, Tainan, Taiwan

Filed Mar. 1, 1990, Ser. No. 486,909

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—101 3 Claims



1. An ultraviolet lamp assembly for immersion in the water of an aquarium comprising:

an tubular ultraviolet lamp having electric supply conductors;

a compartment means wrapped in a helical pattern around and along the length of the ultraviolet lamp;

an elongated reflector means having two open ends and enveloping said ultraviolet lamp and compartment means with its inner surface abutting against an outer periphery of the compartment means for defining a helical fluid flow passage therein;

plug means secured to the open ends of the reflector means;

passage means formed in the plug means and communicating ends of the helical passage defined by the compartment means; and

pipe means connected to the passage means of the plug means for communicating the helical passage and exterior of this assembly.

4,956,755

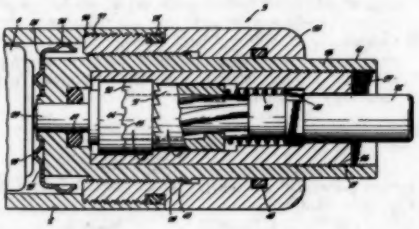
MECHANICAL ACTUATION

Anthony Maglica, 219 Armsley Sq., Ontario, Calif. 91763; Robert J. DeLong, 9168 E. Jaylee Dr., Temple City, Calif. 91780, and Armis L. Lewis, 10617 Sunburst Dr., Cucamonga, Calif. 91730

Division of Ser. No. 106,064, Oct. 7, 1987, Pat. No. 4,841,417, which is a continuation-in-part of Ser. No. 43,086, Jul. 27, 1987, Pat. No. 4,819,141, which is a continuation-in-part of Ser. No. 34,918, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 828,729, Feb. 11, 1986, Pat. No. 4,658,336, which is a continuation of Ser. No. 648,032, Sep. 6, 1984, Pat. No. 4,557,263. This application May 11, 1989, Ser. No. 350,386

Int. Cl.[5] F21L *7/00*

U.S. Cl. 362—206 7 Claims



1. A push button actuator comprising:

a housing;

a first plunger having a first end positioned at an initial position within said housing;

a second plunger having a first end positioned at an initial position within said housing;

means to convert longitudinal motion of said second plunger into rotational motion and to convert said rotational motion into longitudinal motion of the first plunger whereby the first end of the first plunger is moved to, but not beyond a second position and the actuator is thereby alternatingly switched from a condition of on to off.

4,956,756

TABLE LAMP ADAPTER SYSTEM

Wen J. Hsiao, No. 20, Lane 126, Jen AI Street, Hsin Chu City, Taiwan

Filed Feb. 10, 1989, Ser. No. 308,604

Int. Cl.[5] H01R *33/00*

U.S. Cl. 362—226 2 Claims

1. A table lamp adapter system for providing interchangeability between incandescent and fluorescent light bulbs, comprising:

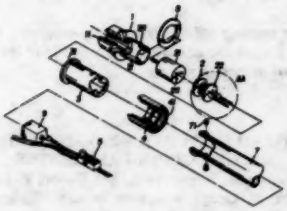
(a) a lamp holder tubular housing having a front section coupled to said light bulb and a rear section having a stub member protruding therefrom;

(b) selector switch means for switching reversibly from incandescent to fluorescent light bulb power actuation, said selector switch means including a contact plug member received within said lamp holder tubular housing;

(c) a sleeve member having a guide slot formed therein, said stub member being linearly displaceable within said guide slot;

(d) a spiral coupling having internal threads and rotatable responsive to said linear displacement of said stub within said guide slot, said spiral coupling being mounted on said sleeve member on a frontal portion thereof in a manner such that through alignment of said internal threads with said guide slot, said stub member is displaced within said guide slot;

(e) a support arm member fixedly coupled to a rear portion of said sleeve member, said selector switch means further



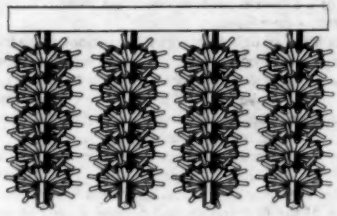
including a conduction member having four terminals arranged in two sets, said conduction member being mounted in said sleeve member, said conduction member further including a front end surface member having four recess holes and a rear end surface member which includes four mandrels for mounting thereon of four springs respectively wherein two pairs of terminals are respectively mounted on said springs, said springs in alignment with said mandrels and recess holes of said front end surface member, said terminals being resiliently mounted whereby a pair of contact noses of said contact type plug may be selectively in contact with said pairs of said terminals of said conduction member.

4,956,757

LAMP DEVICE

Chern-Jen Wang, No. 199, Sec. 1, Hua Mei W. St., Taichung, Taiwan

Filed Aug. 21, 1989, Ser. No. 396,298
Int. Cl.[5] F21P 1/00
U.S. Cl. 362—252 1 Claim



1. A lamp device comprising: a plurality of lamps each of which has a lamp base provided with two electric contacts;

a lamp-holding member having two half portions detachably connected with each other, each of said half portions having an annular member with a central opening and a plurality of channel members with a groove extending radially from a periphery thereof which mates with said channel member of another said half portions to define a socket for holding one of said lamp bases of said lamps;

a plurality of conducting members positioned among said channel members of said lamp-holding member and connected with said contacts of said lamps so as to form a series circuit;

at least two fixing seats mounted diametrically opposite in said lamp-holding member which are adjacent to central openings, each of said fixing seats having a contact member mounted therein and being electrically connected to said series circuit;

an elongated insulating column having at least two opposed grooves formed along a length thereof, each of said grooves having a conducting strip fixed therealong, said column being adapted to be passed through said central openings of said lamp-holding member with said conducting strips thereof being slidably engaged with said contact members;

whereby said column can pass through a plurality of said lamp-holding members to form a linear lamp assembly; and

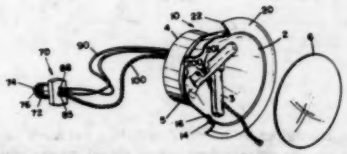
wherein each of said grooves of said column is generally U-shaped in cross section with a bottom portion and has a channel which is trapezoidal in cross section formed inwardly along said bottom portion of said groove for receiving one of said conducting strips.

4,956,758

LAMP MOUNTING APPARATUS AND METHOD

Truman R. Aubrey, Glendale, and Steven R. Gerke, Los Angeles, both of Calif., assignors to Janice Industries, Los Angeles, Calif.

Filed Apr. 10, 1989, Ser. No. 335,554
Int. Cl.[5] F21V 17/06
U.S. Cl. 362—285 18 Claims



1. A lamp mounting apparatus comprising:

electrical connector means;

support means for supporting at least one lamp receptacle;

said support means having at least one aperture therethrough; and

elongated means connected to said electrical connector means and extending through said aperture in said support means;

said aperture arranged to selectively engage said elongated means to prevent movement of said elongated means relative to said support means.

4,956,759

ILLUMINATION SYSTEM FOR NON-IMAGING REFLECTIVE COLLECTOR

Jill F. Goldenberg, Pelham Manor, N.Y., and Roland Winston, Chicago, Ill., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,593
Int. Cl.[5] F21V 7/00
U.S. Cl. 362—297 18 Claims

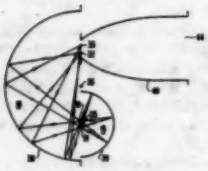
1. An illumination system comprising

a light source,

a first concave mirror positioned to collect substantially all of the luminous flux emitted within a first half space and to reflect it toward a second opposite half space, said first concave mirror being profiled to form a first image of said light source proximate to said light source,

a second concave mirror positioned to collect all the light emitted by the light source within said second half space

as well as all the light reflected by said first concave mirror through said first image into said second half space, said second concave mirror being profiled to form a second image of said light source at a point remote therefrom



and to form a third image proximate to said second image, said third image being formed from said first image,

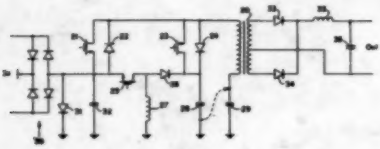
a non-imaging reflector having an input aperture positioned to receive substantially all the light from said second and third images of said light source.

4,956,760

HIGH POWER SWITCHING POWER SUPPLY HAVING HIGH POWER FACTOR

Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Jan. 31, 1989, Ser. No. 304,509
Int. Cl.[5] H02M 3/335
U.S. Cl. 363—16 18 Claims



1. Switching power supply converting pulsating input voltage having one polarity into output signal, comprising:

a first capacitive means coupled to ground for storing a first voltage having the opposite polarity;

an inductive means coupled in series with the first capacitive means for providing the output signal;

a second capacitive means coupled to ground for storing a second voltage having the opposite polarity;

a switch means for alternatively applying the input voltage or second voltage to the inductive means; and

a charging means coupled to the input voltage for charging the second capacitive means.

4,956,761

SWITCHING POWER SOURCE APPARATUS OF RINGING CHOKE CONVERTER SYSTEM

Shinya Higashi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 25, 1988, Ser. No. 160,322
Claims priority, application Japan, Feb. 27, 1987, 62-28214[U]
Int. Cl.[5] H02M 3/338
U.S. Cl. 363—19 2 Claims

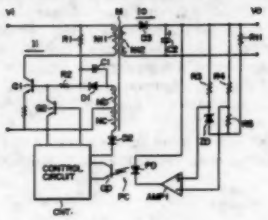
1. A switching power source apparatus of a ringing choke converter system, comprising:

a switching transistor;

load detecting means for detecting that a load connected to said switching power source apparatus is either one of large and normal loads or a small load and outputting a detection signal; and

sawtooth wave voltage generating means for generating a sawtooth wave voltage;

means for increasing a duty ratio of said sawtooth wave voltage means when one of said large and normal loads is detected by said load detecting means; and



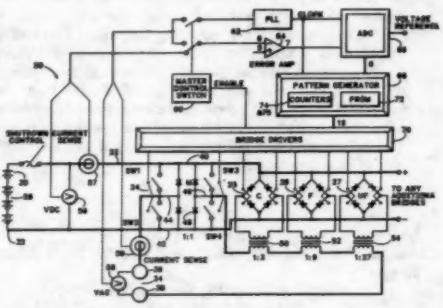
means for turning off said switching transistor to decrease the duty ratio thereof when the small load is detected by said load detecting means.

4,956,762

CONTROLLED SWITCHED BRIDGE-BASED POWER RECONFIGURING APPARATUS

Harlan K. Loveness, Beavercreek, and Robert P. Lewis, Hillsboro, both of Oreg., assignors to S-V Technology, Inc, Portland, Oreg.

Filed Jan. 13, 1989, Ser. No. 297,500
Int. Cl.[5] H02M 7/00
U.S. Cl. 363—65 5 Claims



2. A power manipulating apparatus for manipulating an input source of power having a voltage of a predetermined amplitude characteristic into an output power source having a voltage of a different predetermined amplitude characteristic, the apparatus comprising:

a plurality of switching bridge means coupled in series, each bridge means comprising two input terminals coupleable to an input power source, two output terminals on which an output power source in generated, and four switch means for coupling selectively each of the input terminals to each of the output terminals;

means for generating, for each bridge means, first and second control signals representative of a predetermined pattern of switching of the associated four switch means, each of the first and second control signals being associated with two of the switch means and having two states, the means for generating first and second control signals being responsive to a third control signal having two states, with all of the first and second control signals having a third state when the third control signal is in a first state whereby all of the switch means are open, and the first and second control signals are in the first and second states as determined by the means for generating the first and second control signals when the third control signal is in the second state;

switch driver means responsive to the first and second control signals and coupled to each of the switch means, with

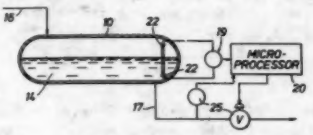
the switch driver means associated with a first switch means opening the first switch means and the switch driver means associated with the second switch means closing the second switch means when the corresponding one of the first and second control signals is in a first state, and the first switch driver means closing the first switch means and the second switch driver means opening the second switch means when the corresponding one of the first and second control signals is in the second state; and means controllable for generating the third control signal in either the first or second state.

4,956,763

PORTABLE SELF-CONTAINED SURGE LEVEL CONTROLLER

William B. Stewart, Jr., Houston; Henry K. Lau, Sugarland, and Anthony M. Leonardi-Cattolica, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 29, 1988, Ser. No. 226,171
Int. Cl.[5] F17D *3/01*; F01N *23/00*
U.S. Cl. 364—154 **20 Claims**



1. For controlling the flow in a fluid-containing in-line vessel having a surge or reservoir capacity, a surge level control system, comprising:

(a) a neutron backscatter level detector having detectable count rates attachable to such a vessel for detecting the fluid level therein, and having at least two spaced neutron sources and means for converting the detected count rates to a substantially continuous indication of the detected fluid level; and

(b) computational means connected to said level detector and connectable to regulate the flow in such a vessel in response to the detected fluid level by:

(i) estimating an instantaneous mass imbalance and predicting the resultant volume in the vessel;

(ii) in a predetermined manner, calculating a normal control move in response to said estimated instantaneous mass imbalance and predicted resultant volume;

(iii) determining whether said predicted resultant volume exceeds one of a predetermined volume high limit and a predetermined volume low limit of the vessel, and, when the high limit, then calculating an out-of-limit control move with substantially said volume high limit as a target, and, when the low limit, then calculating an out-of-limit control move with substantially said volume low limit as a target;

(iv) at least when the instantaneous mass imbalance differs from zero by a predetermined amount, and when it is determined by said step of determining whether said predicted resultant volume exceeds one of said vessel limits that neither limit will be exceeded, then calculating an upset move based upon a predetermined relationship of the vessel's surge capacity and said estimated mass imbalance; and

(v) comparing the signs and magnitudes of said calculated moves according to a predetermined relationship to select the move to be implemented;

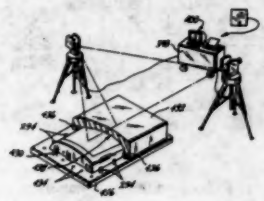
thereby generating control moves to regulate the fluid flow in the vessel to smoothly converge the fluid level in the vessel toward a predetermined volume target or set-point and protect against exceeding the capacity of the vessel.

4,956,764

ASSEMBLY DATA MODEL TOOL SYSTEM

Larry L. Carver, Manhattan Beach; Charles E. Zamzow, Rancho Palos Verdes, and Donald D. Mladenoff, Alta Loma, all of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Continuation-in-part of Ser. No. 50,794, Apr. 14, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,491
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—167.01 **10 Claims**



1. A mold system for use in mold forming a part, said mold system comprising:

a surface;

a plurality of target means for defining a precisely known spatial relationship in a three dimensional coordinate system, said plurality of target means located on said surface for defining precisely known positions on said surface;

an image mold, said image mold including an image of said part, said image mold locatable on said surface in a known association with said target means;

a complimentary mold formed on said image mold and said surface, said complimentary mold including a complimentary image of said part and further including an image of said target means on said surface; and

said image of said target means on said complimentary mold defining precisely known positions on said complimentary mold which are precisely located with respect to said complimentary image of said part on said complimentary mold to precisely define said complimentary image of said part with respect to said three dimensional coordinate system whereby when a part is molded on said complimentary mold, points on said part are precisely known with respect to said three dimensional coordinate system.

4,956,765

APPARATUS FOR PROCESSING NUMERICAL CONTROL PROGRAM

Takashi Iwagaya, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00283, § 371 Date Jan. 7, 1988, § 102(e) Date Jan. 7, 1988, PCT Pub. No. WO87/07045, PCT Pub. Date Nov. 19, 1987
PCT Filed May 7, 1987, Ser. No. 150,652
Claims priority, application Japan, May 7, 1986, 61-104086
Int. Cl.[5] G06F *15/02, 3/02*
U.S. Cl. 364—192 **5 Claims**

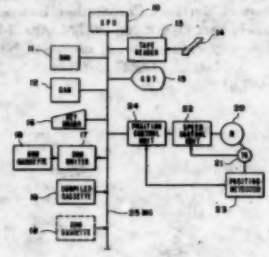
1. An apparatus for processing a numerical control program for controlling a numerical control system, comprising:

compiler cassette means for compiling data and being detachable from the apparatus and including converting means for converting a numerical control program input to the numerical control system in the form of a high-level language to a machine language applicable to the numerical control system;

ROM cassette means, detachable from the apparatus and having a read-only memory, for storing programs;

writing means for writing the numerical control program as converted to the machine language by said compiler cas-

sette into the read-only memory of said ROM cassette means; and



control means for controlling the numerical control system according to the numerical control program stored in the read-only memory of said ROM cassette means.

4,956,766

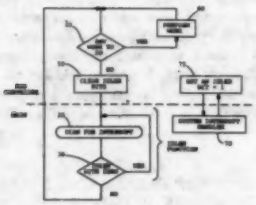
SYSTEMS FOR INHIBITING ERRORS CAUSED BY MEMORY CARTRIDGE INSERTION/REMOVAL USING AN IDLE LOOP

Dhireadra Dhopeshwarkar; Scott A. Hightower; Mac A. Mathis, and John W. Mehl, all of Lexington, Ky., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jul. 25, 1985, Ser. No. 759,002

Int. Cl.[5] G06F *9/04, 11/20, 11/36*

U.S. Cl. 364—200 **11 Claims**



1. In a computer system arranged to perform tasks initiated at operator request, which system includes a central processor and main memory interconnected by a system bus, and in which at least some of said tasks require additional memory cartridges, a method of inhibiting errors caused by the insertion or removal of a memory cartridge, said method comprising the steps of:

(a) providing a cartridge bus to which memory cartridges are connected or disconnected on insertion or removal,

(b) providing a controllable isolation between said system bus and said cartridge bus, and

(c) providing an idle loop for said central processor, which idle loop does not provide access to said cartridge bus, said idle loop having an exit to a path allowing access to said cartridge bus by said central processor in response to a predetermined condition so that said idle loop is effective to prevent access to said cartridge bus except in response to a said predetermined condition which is present when an operator requests a task to be performed.

4,956,767

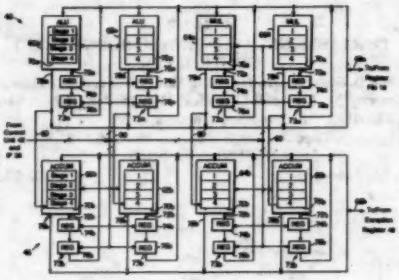
DATA PROCESSING SYSTEM WITH MODEL FOR STATUS ACCUMULATING OPERATION BY SIMULATING SEQUENCE OF ARITHMETIC STEPS PERFORMED BY ARITHMETIC PROCESSOR

R. Ashley Stephenson, Tewksbury, Mass., assignor to Stellar Computer, Inc., Newton, Mass.

Filed Feb. 23, 1988, Ser. No. 159,179

Int. Cl.[5] G06F *7/46, 9/455, 15/36, 15/46*

U.S. Cl. 364—200 **12 Claims**



7. A system for accumulating a status of execution of an arithmetic operation that comprises a sequence of steps, comprising

an arithmetic processor having hardware elements for performing said sequence of steps, each said step being performed on one or more operands that have status values and producing an intermediate or final arithmetic result and is capable of producing a corresponding status indicator,

means for simulating said hardware elements in a model that performs simulated steps on said status values analogous to the sequence of steps performed by said hardware elements on said operands that have said status values, said simulated steps including an accumulation operation on the status values of said one or more operands; and

means for controlling the operation of said model so that, while said hardware elements are performing each one of said sequence of steps of said arithmetic operation, said model performs said analogous simulated steps on said status values so that, for each intermediate or final arithmetic result produced by one of said hardware elements, said model produces a corresponding intermediate or final arithmetic result produced by one of said hardware elements, said model produces a corresponding intermediate or final status result at a point in said model that corresponds to said hardware element, said intermediate or final status result being a function of the status values of the one or more operands operated on to produce said corresponding intermediate or final arithmetic result,

said means for controlling causing said arithmetic processor to apply each said status indicator to said point in said model that corresponds to the hardware element that performs said arithmetic operation step, and

said model including means for accumulating at each said point in said model said status indicator with said status values of the one or more operands operated on by said hardware element in performing said arithmetic operation step,

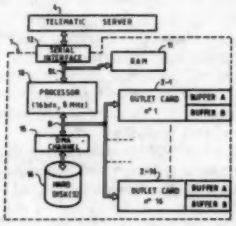
whereby the intermediate or final status results each represent an accumulation of the status of the steps of the arithmetic operation that are performed to produce the corresponding intermediate or final arithmetic result and represent the status values of the operands on which said steps are performed, and whereby the final status result pro-

duced by said model will represent the accumulated status of the execution of the arithmetic operation.

4,956,768
WIDEBAND SERVER, IN PARTICULAR FOR TRANSMITTING MUSIC OR IMAGES

Jean A. Sidi, Saint Martin de Londres, and Claude B. Nogrady, Montpellier, France, assignors to Etat Francais, Centre National d'Etudes des Telecommunications, Paris, France

Filed Feb. 24, 1988, Ser. No. 159,767
Claims priority, application France, Feb. 25, 1987, 8702514
Int. Cl.[5] G06F *3/00, 3/14, 15/20*
U.S. Cl. 364—200 **14 Claims**



1. An electronic apparatus suitable for constituting a wideband server, in particular for transmitting music or images, comprising in combination:

a main processor possessing a direct memory access channel;

a large capacity mass memory of the hard disk type, connected to said direct memory access channel; and

a plurality of outlet units, operatively connected to said direct memory access channel and each possessing two buffer memories of equal capacity and an auxiliary processor operatively connected thereto, said buffer memories being dual-access memories operatively connected to said direct memory access channel and operated in alternating mode by said auxiliary processor to empty said buffer memories in alternation without discontinuity with one of said two buffer memories being read from while the other of said two buffer memories is simultaneously filled at high speed with new data from said large capacity mass memory.

4,956,769
OCCURENCE AND VALUE BASED SECURITY SYSTEM FOR COMPUTER DATABASES

Robert D. Smith, Malibu, Calif., assignor to Sysmith, Inc., Marina Del Rey, Calif.

Filed May 16, 1988, Ser. No. 194,481
Int. Cl.[5] H04L *9/00;* **G06F** *13/00*
U.S. Cl. 364—200 **6 Claims**

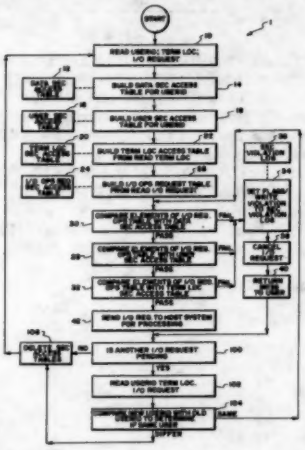
1. In a computer host system interfacing Input/Output requests between at least one system user identified by a unique user identification symbol that is accessing the host system from at least one terminal location having a unique terminal address, and the host system having at least one database having data records, including data fields, a method for providing occurrence level, value based security protection, limiting to selected users and terminal locations access to preselected, but variable Input/Output operations on selected data records and data fields of the databases, comprising the steps of:

(a) establishing at said computer host system a data security access table having, for each data record and data field selected for security protection, a first entry identifying the data record and the data field and a second entry representing a data security profile associated therewith, said second entry defining the Input/Output operations permitted on the the data record and data field identified by said associated first entry;

(b) establishing at said computer host system a user security access table having, for each user selected to have Input/Output access to the database, a first entry identifying the user and a second entry representing a user security profile associated therewith, said second entry defining the Input/Output operations permitted on the database by the user identified by said associated first entry;

(c) establishing at said computer host system a terminal location security access table having, for each terminal location selected to have Input/Output operation access to the database, a first entry identifying the terminal location and a second entry representing a terminal location security profile associated therewith, said second entry defining the Input/Output operations permitted on the database from the terminal location identified by said associated first entry;

(d) parsing each Input/Output request from the host system to the database and extracting therefrom: (1) the unique user identification symbol of the system user making the Input/Output request; (2) the data record or data field that is the subject of the Input/Output request; (3) the terminal location address from which the Input/Output request is being made; and, (4) the requested Input/Output operation;


START
READ USER/TERM LOC. I/O REQUEST
BUILD USER SEC ACCESS TABLE FOR USER/IO
BUILD TERM LOC ACCESS TABLE FROM READ TERM LOC
BUILD I/O OPN REQUEST TABLE FROM READ I/O REQUEST
SEND I/O REQ TO HOST SYSTEM FOR PROCESSING
IS ANOTHER I/O REQUEST PENDING
YES
NO
READ USER/O TERM LOC. I/O REQUEST
SAME
BUFFER

(e) building at said computer host system a request table having as its first entry the extracted unique user identification symbol, as its second entry the extracted subject data record and data field, as its third entry the extracted terminal location address, and as its fourth entry the extracted requested Input/Output operation;

(f) comparing said first request table entry for the unique user identification symbol with the first entry of the user security access table and setting at said computer host system a first security condition "flag" to an "allowed" condition if a match is found and otherwise to a "violation" condition;

(g) comparing said fourth request table entry for the requested Input/Output operation with said second entry of said user security access table whenever said first security condition "flag" is in said "allowed" condition and setting said first security condition "flag" to a "violation" condition if no match is found;

(h) comparing said second request table entry for the data record or data field entry that is the subject of the Input/Output request with the first data security access table entry and setting at said computer host system a second security condition "flag" to an "allowed" condition if a match is found and otherwise to a "violation" condition;

(i) comparing said fourth request table entry for the requested Input/Output operation with said second entry of

said data security access table whenever said second security condition "flag" is in said "allowed" condition and setting said second security condition "flag" to a "violation" condition if no match is found;

(j) comparing said third request table entry for the terminal location address with the first terminal location security access table entry and setting at said computer host system a third security condition "flag" to an "allowed" condition if a match is found and to a "violation" condition otherwise;

(k) comparing said fourth request table entry for the requested Input/Output operation with said second entry of said terminal location security access table whenever said third security condition "flag" is in said "allowed" condition and setting said third security condition "flag" to a "violation" condition if no match is found;

(l) writing at said computer host system said request table entries to a security log database whenever said first, second or third security condition "flag" is in said "violation" condition and cancelling the execution of the parsed Input/Output request by the host system;

(m) returning the Input/Output request to the host system for processing whenever said first, second and third security condition "flag" is not in said "violation" condition.

4,956,770

METHOD AND DEVICE TO EXECUTE TWO INSTRUCTION SEQUENCES IN AN ORDER DETERMINED IN ADVANCE

Sten E. Johnson, Huddinge, and Lars-Örjan Kling, Södertälje, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

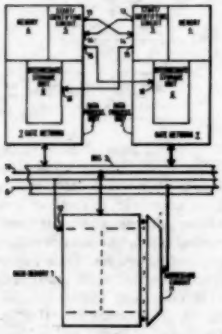
PCT No. PCT/SE87/00437, § 371 Date May 17, 1988, § 102(e) Date May 17, 1988, PCT Pub. No. WO88/02513, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 28, 1987, Ser. No. 197,410

Claims priority, application Sweden, Oct. 3, 1986, 8604223

Int. Cl.[5] G06F *9/30*

U.S. Cl. 364—200 **2 Claims**



1. A method of operating computer means to enable the computer means to execute a first and second instruction sequence, said computer means comprising auxiliary memory means and a main memory comprising a plurality of main memory locations accessible by an address, said instruction sequences adapted to be executed sequentially in a predetermined order and each instruction sequence comprising at least one instruction, said at least one instruction being selected from at least one read instruction and at least one write instruction, each of said at least one read instruction comprising a read address for retrieval of data stored in one of said main memory locations accessible by said read address, and each of said at least one write instruction comprising data and an associated write address, said write address for specifying one of the main memory locations to which said write instruction data is to be transferred, wherein data used in conjunction with the execution of the second sequence is not necessarily independent of data obtained in conjunction with the execution of the first sequence, said method comprising the steps of:

executing the instructions in both sequences independent of the predetermined order for execution of the sequences;

preventing data transfer to the main memory locations during execution of said first sequence, if said data to be transferred is obtained from the execution of said at least one write instruction of said second sequence;

upon encountering said at least one write instruction during the execution of said second sequence, intermediately storing the write address and data of said at least one write instruction in said auxiliary memory means;

upon encountering the at least one said read instruction during the execution of said second sequence, intermediately storing the read address of said at least one read instruction in said auxiliary memory means, if said read address is not equal to any address which was encountered in conjunction with execution of the at least one write instruction of said second sequence;

comparing each read address encountered during the execution of said second sequence and the intermediately stored write address and generating a first signal when said compared read address is equal to one of the intermediately stored write addresses;

preventing, upon receiving said first signal, reading of the data from the main memory location accessible by said compared read address and instead reading from said auxiliary memory means the intermediately stored data associated with said write address;

comparing the write address of the at least one write instruction encountered during execution of said first sequence to the intermediately stored read addresses and generating a second signal when one of said compared write addresses is equal to one of the intermediately stored read addresses;

reexecuting the at least one instruction of said second sequence responsive to generation of said second signal; and

transferring, responsive to termination of the execution of said first sequence, any intermediately stored data into the main memory locations accessible by the associated intermediately stored write addresses.

4,956,771

METHOD FOR INTER-PROCESSOR DATA TRANSFER

Tuvi Neustaedter, Ashland, Mass., assignor to Prime Computer, Inc., Natick, Mass.

Filed May 24, 1988, Ser. No. 198,161

Int. Cl.[5] G06F *15/20, 13/00, 12/00*

U.S. Cl. 364—200 **22 Claims**

1. In a computer system comprising a host computer coupled to an intelligent controller, said host computer including a virtual memory, said virtual memory including an I/O segment, a method for transferring data between a plurality of tasks being executed in the host computer and a corresponding plurality of tasks being executed in the controller, each pair of corresponding tasks in the host computer and the controller having a logical connection therebetween, said method comprising the steps of:

said host computer allocating to each connection one or more memory buffers for holding said data;

said host computer providing for each connection an output queue for queueing descriptions of output buffers containing data ready for transfer from the host computer to the controller;

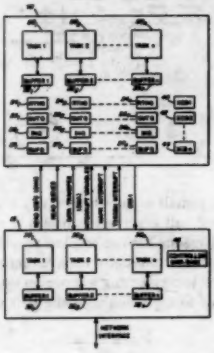
said host computer providing for each connection a buffer queue for queueing descriptions of input buffers available for transfer of data from the controller to the host computer;

for each host computer task having data for transfer to said controller, said host computer writing the data to a selected output buffer, writing a description of the selected

output buffer on the associated output queue, and notifying the controller of activity on the associated output queue;

for each controller task having data for transfer to said host computer, said controller reading a description of a selected input buffer from the associated buffer queue;

for each data transfer, said controller forwarding the description of the selected output buffer or the selected input buffer from the controller to the host computer;



for each data transfer, said host computer mapping the selected output buffer or the selected input buffer to the I/O segment of virtual memory;

said controller reading the selected output buffer through said I/O segment; and

said controller writing to the selected input buffer through said I/O segment and notifying the associated task that data has been written in the selected input buffer.

4,956,772

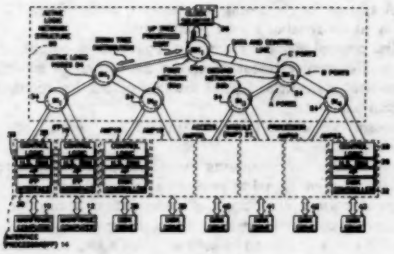
METHODS OF SELECTING SUMULTANEOUSLY TRANSMITTED MESSAGES IN A MULTIPROCESSOR SYSTEM

Philip M. Neches, Pasadena, Calif., assignor to Teradata Corporation, Los Angeles, Calif.

Division of Ser. No. 755,436, Jul. 16, 1985, Pat. No. 4,814,979, which is a division of Ser. No. 601,808, Apr. 19, 1984, Pat. No. 4,543,630, which is a division of Ser. No. 250,094, Apr. 1, 1981, Pat. No. 4,445,171. This application Nov. 3, 1988, Ser. No. 266,899

Int. Cl.[5] G06F *13/376, 13/368, 15/16, 15/40*

U.S. Cl. 364—200 **19 Claims**



1. A method of processing data using a plurality of processor modules comprising the steps of:

a. subdividing a data processing task into information packets each said information packet representing a subtask;

b. simultaneously broadcasting pairs of successive said information packets to a priority determining network having a plurality of priority determining holes;

c. determining at each said priority determining node which said information packet of the broadcasting pair has a higher priority solely based upon data contents thereof;

d. selecting by said priority determining network a chosen information packet from a plurality of said information packets each having a higher priority;

e. broadcasting successive chosen information packets to all the processor modules simultaneously, each of the chosen information packets containing a characterizing message;

f. determining from the characterizing message in each said chosen information packet, at all the processor modules, an appropriate individual processor module or modules for carrying out the subtask represented by each said chosen information packet;

g. generating processed information packets at the processor modules based upon result of said determining step;

h. broadcasting different ones of the processed information packets to all the processor modules simultaneously.

4,956,773

SYSTEM AND METHOD OF GENERATING A SOURCE PROGRAM FROM INPUTTED SCHEMATIC INFORMATION

Kazumasa Saito, Aso; Hiroyuki Maezawa, Sagamihara; Masakazu Kobayashi, Ota, and Yoshihiko Futamura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

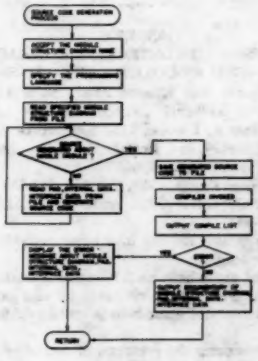
Continuation of Ser. No. 145,410, Jan. 19, 1988, Pat. No. 4,831,525, which is a continuation of Ser. No. 695,229, Jan. 28, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 329,598

Claims priority, application Japan, Jan. 30, 1984, 59-13461

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] G06F *9/00*

U.S. Cl. 364—200 **13 Claims**



1. A method of generating a source program in an information processing system having a processing means, comprising the steps of:

preparing various schematic information items which include a flow of processes for said processing means; and

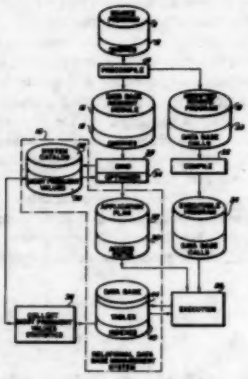
generating the source program based on prepared schematic information items in said processing means.

4,956,774

DATA BASE OPTIMIZER USING MOST FREQUENCY VALUES STATISTICS

Akira Shibamiya, Los Altos, and Melvin R. Zimowski, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,712
Int. Cl.[5] G06F *15/40*
U.S. Cl. 364—200 9 Claims



1. In a method for accessing data of a relational data base management system having at least one index, the improvement characterized by the steps performed by a computer of:

(a) selecting a number of most frequently occurring values of at least part of a key of the index, the number being greater than zero and less than a total number of such values;

(b) collecting frequency of occurrence statistics for the selected most frequently occurring values of the index;

(c) estimating a time required for using the index as the access path, based at least in part on the collected frequency of occurrence statistics;

(d) selecting an access path based at least in part on the estimated time; and

(e) accessing the data using the selected access path.

4,956,775

OBJECT SENSOR FOR DETECTING CHARACTERISTICS SUCH AS COLOR FOR GAMES

Reuben B. Klamer, 969 Hilgard Ave. - Suite 1001; David I. Lappen, 10427 Linbrook Dr., both of Los Angeles, Calif. 90024; William A. Lappen, 2167 Kenilworth Ave., Los Angeles, Calif. 90039, and Beatriz E. Pardo, 2234-A Bentley Ave., Los Angeles, Calif. 90064

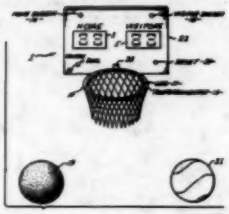
Filed Oct. 1, 1985, Ser. No. 782,557
Int. Cl.[5] G06F *15/28*; A63B *67/00, 63/02*
U.S. Cl. 364—411 6 Claims

1. Game apparatus for use in a game providing automatic scoring comprising:

a plurality of game balls each being of a particular color,

means defining a single scoring area for said game when one of said plurality of game balls is found within said scoring area;

a sensor for sensing the presence of one of said balls in the single scoring area and producing a scoring event signal, said sensor including light means for illuminating the one of said game balls in the signal scoring area responsive to said scoring event signal and photoelectric means for receiving light reflected by the one of said game balls in said scoring area, and for providing a plurality of sensor output signals indicative of the reflectivity of the one of said game balls and for averaging the plurality of signals to determine reflectivity in order to reduce errors, with which reflectivity of said one of said game balls said sensor identifies said particular one of said game balls by its color, said sensor including delay means for delaying the beginning of sensor signals indicating reflectivity and lengthening the shortest time within which two consecutive scoring event signals can be generated, thereby assuring that noise signals are not sensed as a scoring event and no single game ball is sensed as multiple game balls; and



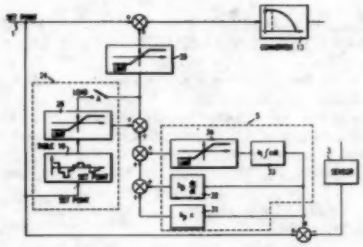
a score-keeping means having display means for a plurality of a scores for automatically monitoring said sensor output signals and incrementing a score on said display means corresponding to a particular game ball detected in said scoring area.

4,956,776

DEVICE FOR MANAGING AN ELECTROHYDRAULIC PRESSURE CONTROL

Jean-Claude Carre, Asnieres, France, assignor to Regie Nationale Des Usines Renault, Boulogne-Billancourt, France

Continuation of Ser. No. 209,969, Jun. 22, 1988, abandoned.
This application Jan. 22, 1990, Ser. No. 465,649
Claims priority, application France, Jun. 22, 1987, 87 08746
Int. Cl.[5] G05B *13/02*; G06F *15/00*
U.S. Cl. 364—424.1 2 Claims



1. A system for regulating a parameter, comprising:

an input for receiving a set point signal;

a first control element having an input and an output;

second control element receiving the output of said first control element and producing an output for regulating said parameter;

a sensor connected to the output of said second control element;

a comparator for comparing the output of said sensor with said set point signal to produce an error signal;

a proportional-plus-integral-plus-derivative controller receiving said error signal and producing an output;

a table being addressed by said set point signal to produce a value in response thereto;

means for adding said value, the output of said proportional-plus-integral-plus-derivative controller and the set point signal to produce an output;

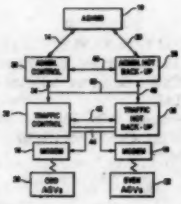
a converter receiving the output of said adding means to produce an output connected to the input of said first control element, said converter thus continuing to provide an output even in the event of the failure of said sensor.

4,956,777

AUTOMATIC VEHICLE CONTROL SYSTEM

Thomas W. Cearley, Clemmons; Michael F. Donovan, Advance; Raymond A. Gardea, II, Winston-Salem; Kolleen C. Hughes, King; William R. Hunt, III, Mt. Airy; William R. Jarvis; Marvin R. Martin, both of Winston-Salem, all of N.C.; Aftab Shamb, Clay, N.Y.; Michael D. Shepard, Winston-Salem, N.C.; William F. Summers, Mocksville, N.C.; David C. Twine, Winston-Salem, N.C., and Lonnie M. Utt, Jr., Mt. Airy, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jun. 9, 1988, Ser. No. 204,336
Int. Cl.[5] C06F *15/50*
U.S. Cl. 364—424.02 19 Claims



9. A system, comprising:

a guided vehicle path;

a plurality of guided vehicles operating along said path;

a plurality of indicators positioned along said path for indicating to said vehicles position on said path; and

a guided vehicle controller, comprising:

means for communicating with said guided vehicles;

a first computer system for exchanging information with said guided vehicles through said communicating means, said first computer system including a first memory section for storing information received from said vehicles including vehicle position information of each vehicle in relation to said indicators and including a second memory section for storing information to be transmitted to said vehicles including vehicle destination information;

a second computer system for receiving vehicle movement requests from external sources and determining which vehicles are to respond to said requests, said second computer system including a third memory section for storing information relating to vehicle position in relation to said indicators and including a fourth memory section for storing information including vehicle destination information;

first transfer means for copying said information in said first memory section to said third memory section so that said first memory section and said third memory section contain the same vehicle position information; and

second transfer means for copying said information in said fourth memory section to said second memory section so that said fourth memory section and said second memory section contain the same vehicle destination information;

wherein said first computer system polls said vehicles using a fast polling routine for vehicles within a first predetermined distance of a next position indicator and using a slow polling routine after the fast polling routine is completed, and wherein said fast polling routine includes requesting information from each vehicle as to its position, storing said requested fast polling position information in said first memory section and indicating to each fast polled vehicle whether it should stop or continue

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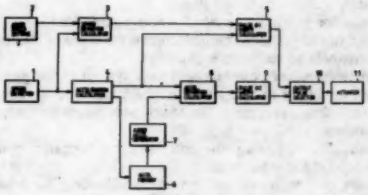
4,956,778

CONSTANT SPEED HOLDING DEVICE

Yasuo Naito, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,856
Claims priority, application Japan, Jul. 2, 1987, 62-167173
Int. Cl.[5] B60K *31/04*
U.S. Cl. 364—426.04 4 Claims



1. A constant speed holding device for a vehicle, said device enabling said vehicle to recover to a constant speed, said device comprising:

a running speed detector for measuring an actual speed of a vehicle.

an aimed speed setting means for setting a speed desired by an operator;

a speed deviation calculating means responsive to an actual running speed signal from said running speed detector and a set speed signal from said aimed speed setting means for calculating a speed deviation therebetween;

an acceleration calculating means responsive to the running speed signal for calculating an acceleration of the vehicle;

a first pulse width calculating means responsive to a speed deviation signal from said speed deviation calculating means and an acceleration signal from said acceleration calculating means for calculating a pulse width of a first pulse signal having a predetermined period;

an acceleration memory means for storing a value of the acceleration signal in the past;

an aimed acceleration generating means responsive to an output of said acceleration memory means for generating an aimed acceleration α_0;

an acceleration deviation calculating means responsive to the aimed acceleration signal and the acceleration signal for calculating an amount of acceleration deviation and outputting an acceleration deviation signal accordingly;

a second pulse width calculating means responsive to the acceleration deviation signal for calculating a pulse width of a second pulse signal having a predetermined period;

an output pulse selection means for selecting said first pulse signal when said vehicle is not recovering to said constant speed, or said second pulse signal, when the vehicle is recovering to said constant speed; and

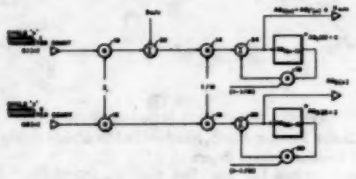
an actuator responsive to a selected output pulse signal for on-off controlling a throttle valve of an engine of the vehicle on the basis of the pulse width thereof.

4,956,779

DIGITAL OVERSPEED CONTROLLER FOR USE IN A VITAL PROCESSING SYSTEM

David B. Rutherford, Rochester, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Nov. 22, 1988, Ser. No. 267,218
Int. Cl.[5] B61L 23/00
U.S. Cl. 364—426.05 **6 Claims**



1. A digital overspeed controller for use in a vital processing system to control vehicle motion, comprising:

signal receiving means for receiving and registering externally generated speed limits;

means for producing system cycle generation;

a pair of independent tachometers connected in independent channels to respective counters;

said tachometer counters and said system cycle generation means being operative to produce identical waveforms;

means for averaging the two independent tachometer counts;

means for adjusting the averaged tachometer counts to account for wheelsize;

means, responsive to said means for adjusting, for generating safe speed verification, such that verification is generated only if the current average train speed is less than the current effective speed limit;

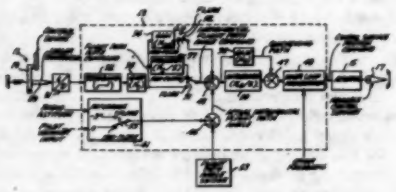
vital profile speed limit generating means for initiating the speed limit profile only when said externally generated speed limits indicate a speed limit change from a higher to a lower limit.

4,956,780

FLIGHT PATH ANGLE COMMAND FLIGHT CONTROL SYSTEM FOR LANDING FLARE

Mithra M. K. V. Sankrithi, Bellevue, and Scott L. Pelton, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 282,265, Dec. 8, 1988, abandoned. This application Jul. 27, 1989, Ser. No. 386,874
Int. Cl.[5] G06F 15/50
U.S. Cl. 364—428 **30 Claims**



1. In an aircraft maneuver command electronic flight control system wherein a continuing pitch axis control signal is produced by a continuing steady input applied to a pilot-operated pitch axis control device, the improvement comprising:

altimeter means for determining the height of the aircraft above the ground and producing a related altimeter signal; and

command modification means responsively connected to said pilot-operated pitch axis control device and to said altimeter means for receiving said pitch axis control signal and said altimeter signal and producing an incremental flight path angle command above a reference value based on the continuing steady input applied to said pilot-operated pitch axis control device, when the aircraft descends below a predetermined height above the ground during a landing maneuver.

20. A method of controlling, during the flare portion of a landing maneuver, the pitch axis movement of an aircraft controlled by an aircraft maneuver command electronic flight control system, said method comprising the steps of:

determining the height of the aircraft above the ground during a landing maneuver; and

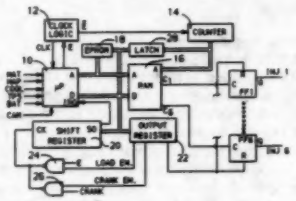
controlling an incremental flight path angle command relative to a reference value in response to the deflection of a pilot-operated pitch axis control device when the aircraft descends below a predetermined altitude above the ground during a landing maneuver.

4,956,781

COUNTER DRIVEN RAM ENGINE CONTROL

Harry R. Calvird, II, Camarillo, and Jimmie R. Siler, Santa Barbara, both of Calif., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Feb. 15, 1989, Ser. No. 310,174
Int. Cl.[5] G06F 15/20
U.S. Cl. 364—431.04 **3 Claims**



1. A system for generating a control signal for controlling a predetermined function in timed relationship to the operation of a vehicle engine, the system comprising, in combination:

a memory having a plurality of addressable memory locations;

addressing means for (A) generating sequential memory addresses in a predictable sequence and at a predetermined frequency and (B) addressing the memory locations in the memory by the generated sequential memory addresses, the memory providing an output control signal corresponding to a stored digital signal at the addressed memory location;

means for generating a reference signal representing a predetermined operating condition of the engine; and

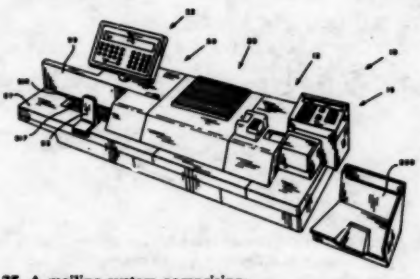
means responsive to the generation of the reference signal for (A) sampling the memory address generated by the addressing means, the sampled memory address representing the time of occurrence T_0 of the reference signal, (B) determining a desired delay from the time T_0 for controlling the predetermined function, (C) determining the memory address that will be generated by the addressing means at a future point in time spaced from the time T_0 by the desired delay, and (D) storing a digital control signal in the memory at the memory location addressed by the determined memory address, whereby the output control signal corresponding to the stored digital control signal will be provided by the memory at a time T_1 spaced from the time T_0 by the desired delay.

4,956,782

MAILING SYSTEM FOR MIXED WEIGHT MAIL

Gerald C. Freeman, Darien, and Seymour Feinland, Stamford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 19, 1986, Ser. No. 909,153
The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.
Int. Cl.[5] G07B *17/02*
U.S. Cl. 364—464.03 35 Claims



35. A mailing system comprising:

a) means for weighing a series of mail pieces;

b) means for transporting the mail pieces to the weighing means, which transport means stops while each mail piece is weighed.

c) means for computing postage based on the weight determined by the weighing means;

d) postage metering means, including settable means for printing indicia; and

e) means for transmitting data from the computing means to the postage metering means;

wherein the postage metering means prints on each mail piece an indicia representative of the postage computed by the computing means.

4,956,783

PRODUCTION PROCESS CONTROL SYSTEM

Mitsuji Teranishi; Yasuo Watanabe, and Akira Takeuchi, all of Osaka, Japan, assignors to ASICS Corporation, Kobe, Japan

Division of Ser. No. 171,226, Mar. 22, 1988, Pat. No. 4,878,176, which is a continuation of Ser. No. 730,185, May 3, 1985, abandoned. This application Sep. 11, 1989, Ser. No. 405,180
Claims priority, application Japan, May 4, 1984, 59-89831
Int. Cl.[5] G06F *1/00*
U.S. Cl. 364—468 14 Claims

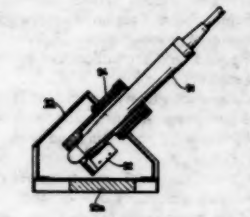
1. A terminal device connectable to a central device for control of a production process in which a plurality of workers perform work on individual workpieces, comprising:

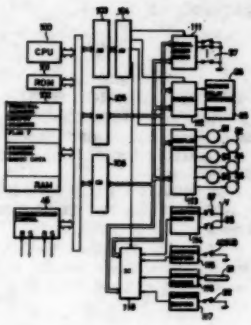
input means for inputting of a signal representing the amount of work done on said workpieces by at least one of said workers;

means for computing a work output based on the input signal;

means for transmitting the computed work output to the central device; and

means for providing an output count cancel signal, wherein the output computing means adds to the current output a value representing the amount of work done according to every input signal received and subtracts a value corresponding to every output count cancel signal received from the current output.



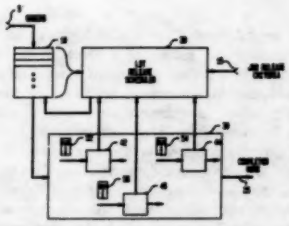


4,956,784

APPARATUS AND A METHOD FOR CONTROLLING THE RELEASE OF JOBS FROM A POOL OF PENDING JOBS INTO A FACTORY

Khosrow Hadavi, Pennington, and Maryam S. Shahraray, Freehold, both of N.J., assignors to Siemens Coporate Research, Inc., Princeton, N.J.

Filed Dec. 14, 1988, Ser. No. 284,165
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—468 18 Claims



1. A method for controlling the release of jobs from a pool of pending jobs into a factory including a plurality of machines processing jobs-in-progress, said method comprising the steps of:

providing a job release scheduler for controlling release of a job from the pool of pending jobs into the factory, said job release scheduler having inputs connected to the machines

and other components of the factory relating to an amount of time required to process a job in the factory and an amount of time anticipated to complete the job within the factory including waiting time at the machines;

calculating a continuity index (CI) for one of the jobs in said pool of pending jobs, said continuity index being related to the total amount of processing time required by said one of said pending jobs, and the anticipated time to complete said one of said pending jobs;

calculating a mean continuity index (MCI) related to an operational parameter of said factory according to management objectives for processing and completing a job in said factory;

calculating a lower range (r1) and an upper range (r2) related to said management objectives; and

operating said job release scheduler for releasing said one of said jobs into said factory if:

$$MCI-r1<CI<MCI+r2.$$

4,956,785

NUMERICAL CONTROL METHOD WITH A PARALLEL PROCESSING FUNCTION

Hideaki Kawamura, Hachioujt; Kentaro Fujibayashi, Mitaka, and Yosato Hidaka, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

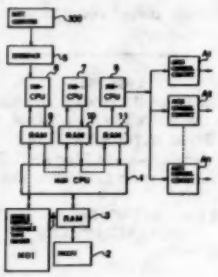
PCT No. PCT/JP88/00046, § 371 Date Jul. 11, 1988, § 102(e) Date Jul. 11, 1988, PCT Pub. No. WO88/05565, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 22, 1988, Ser. No. 243,298

Claims priority, application Japan, Jan. 23, 1987, 62-12583

Int. Cl.[5] F05B *19/403;* F06F *9/22*

U.S. Cl. 364—474.01 **10 Claims**



10. A numerical control apparatus, comprising:

a first processor for receiving a block of command data, executing a first partial process of a preparatory processing block, and for outputting intermediate data;

a first storage unit, operatively connected to said first processor, for storing the intermediate data;

a second processor, operatively connected to said first storage unit, for receiving the intermediate data from said first storage unit, executing a second partial process of the preparatory processing block concurrently with the executing of said first processor, and for outputting executable data,

a second storage unit, operatively connected to said second processor, for storing the executable data; and

a third processor, operatively connected to said second storage unit, for receiving the executable data from said second storage unit and for executing the executable data, concurrently with the executing of said second processor, to prduce pulse distribution signals.

4,956,786

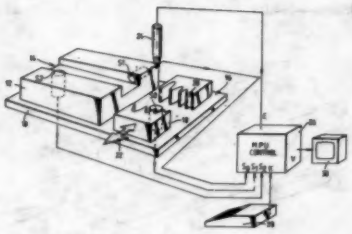
MARKING OR ENGRAVING MACHINE

Stephen J. Drummond, Rickmansworth, and John W. Henry, Colne, both of England, assignors to Rolls-Royce plc, London, England

Filed Jan. 12, 1989, Ser. No. 296,076

Int. Cl.[5] B23C *3/00*

U.S. Cl. 364—474.02 **11 Claims**



1. A marking or engraving machine comprising means for identifying a range of different types of components, memory means for storing in machine readable form part numbers for each of the different types of component, means responsive to an identification of a component to retrieve from said memory means a corresponding part number and means operative to mark or engrave said part number on the component.

4,956,787

ELIMINATION WORK SIMULATOR APPARATUS

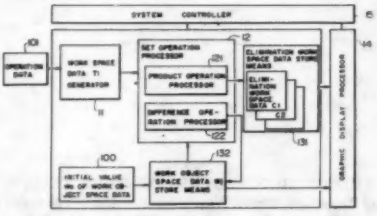
Kumiko Ito, Mito; Yasumasa Kawashima, Hitachi; Shiro Nonaka, Hitachi, and Tomotoshi Ishida, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,640

Claims priority, application Japan, Sep. 21, 1987, 62-234988

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—474.24 **20 Claims**



1. An elimination work simulator in which a work is achieved through m operation units comprising:

a first set operation processor for respectively generating a difference space between an n-dimensional work object space date Wj−1 corresponding to a work object in a jth work operation unit from among j operation units, where j=1, 2, . . . , m, and an n-dimensional work space data Tj corresponding to a space through which a machining device passes in the jth work operation unit in order to provide a difference space respectively corresponding to each of the operation units, wherein n is an integer greater than or equal to 2;

first store means for storing the difference spaces as new work object space data Wj;

a second set operation processor for respectively generating a product space between the work object space data Wj−1 and the work space data Tj in order to provide a

product space respectively corresponding to each of the operation units; and

second store means for sequentially storing the product spaces as elimination work space data Cj.

4,956,788

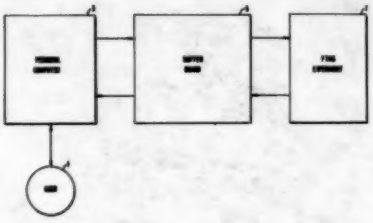
PC-BASED FT/ICR SYSTEM

Shouheng Guan, and Patrick R. Jones, both of Stockton, Calif., assignors to University of the Pacific, Stockton, Calif.

Filed Nov. 28, 1988, Ser. No. 276,979

Int. Cl.[5] G06F 3/14; G01B 9/02

U.S. Cl. 364—498 **4 Claims**



1. In a Fourier transform ion cyclotron resonance mass spectrometer ("FT/ICR"), a system, utilizing a personal computer ("PC") for providing an ion excitation signal and acquiring and storing resulting ion transient data, the system capable of setting up a precise timing interval between the beginning of ion excitation and the end of data acquisition, comprising:

a static random access memory device ("SRAM") for storing digital data;

a digital to analog ("D/A") converter for receiving the ion excitation signal in digital form from said SRAM, converting the ion excitation signal to analog form, and outputting the ion excitation signal in analog form in response to an ion excitation control signal;

an analog to digital ("A/D") converter for receiving the resulting ion transient data in analog form, converting the resulting ion transient data to digital form, and transmitting the resulting ion transient data in digital form to said SRAM in response to a data acquisition control signal;

a state machine ("SM") connected to the PC, said SRAM, said D/A converter, and said A/D converter through control lines, said SM for issuing said ion excitation control signal to said D/A converter causing the ion excitation signal to be output, for issuing said data acquisition control signal to said A/D converter causing said A/D converter to start receiving acquired data, and for issuing a read/write control signal to said SRAM, to control ion excitation, data acquisition, and read/write operations in said SRAM, with said SM starting operation upon receipt of a start operation signal from the PC;

an address counter, connected to said SM and said SRAM, for keeping track of the present memory location of said SRAM and for interacting with said SM such that said SM causes said address counter to be loaded with a selected value and said address counter provides said SM with a count signal every time said address counter counts to a designated value where the occurrence of said count signal causes said SM to issue said data acquisition control signal after the expiration of a predetermined time interval;

a command register, connected to the PC and said SM, for receiving control signals from the PC and passing said control signals onto said SM;

a status register, connected to the PC and said SM, for keeping track of the present state of said SM;

an address latch connected to the PC, said address counter, and said SM for receiving a starting address from the PC and transmitting it to said address counter when issued an address latch control signal by said SM;

a data transceiver, connected to said SRAM, said SM, and the PC, for controlling data transfer direction between said SRAM and the PC when issued a data direction control signal by said SM; and

an address decoder, connected to the PC and said SM, said command register, and said status register, for receiving said starting address from the PC and for transmitting a decode signal to said SM so that said SM may issue said address latch control signal causing said address latch to input said starting address to said address counter.

4,956,789

METHOD AND APPARATUS FOR DRIVING A SERVO SYSTEM WHILE SUPPRESSING RESIDUAL VIBRATION GENERATED DURING POSITION CONTROL

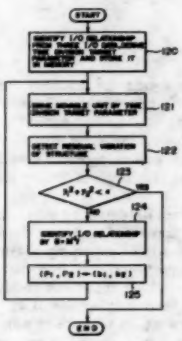
Yoomke Hamada, Ibaraki; Hiromu Hirai, Tsukuba, and Isao Kobayashi, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 10, 1988, Ser. No. 192,135

Claims priority, application Japan, May 13, 1987, 62-114656; May 13, 1987, 62-114657

Int. Cl.[5] G05B 13/04

U.S. Cl. 364—508 **12 Claims**



6. A method for driving a servo system comprising the steps of:

calculating and storing, in response to a move command, a target trajectory for suppressing vibration of a controlled object having a movable unit at a time point immediately after a stop of displacement of the movable unit by using a model of the controlled object, a constraint of an actuator for driving the movable unit and a boundary condition for the displacement;

generating target positions during the displacement of the movable unit based on the target trajectory;

calculating a drive signal to eliminate a difference between a target position and a position of the movable unit detected by a displacement detection device;

driving the actuator by the drive signal to displace the movable unit to a predetermined final position determined by the move command;

detecting vibration of the controlled object at a time point immediately after the stop of the displacement, modifying the target trajectory based on the detected vibration such that a vibration immediately after the stop of displacement is minimized, and storing the modified target trajectory; and

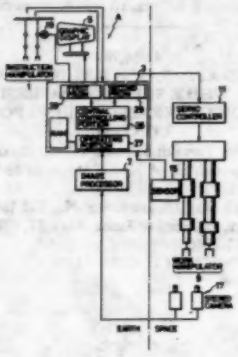
controlling the position of the movable unit in response to a subsequent move command based on the modified and stored target trajectory.

4,956,790

INSTRUCTION SYSTEM OF REMOTE-CONTROL ROBOT

Toshio Tsuchihashi; Yasuaki Wakahara, both of Yokohama, and Kuniji Asano, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 3, 1988, Ser. No. 151,908
Claims priority, application Japan, Feb. 6, 1987, 62-24882
Int. Cl.[5] G05B *19/00*
U.S. Cl. 364—513 **11 Claims**



1. An instruction system for remotely controlling a working apparatus disposed in remote work circumstances, comprising:

(a) an instructing portion for receiving instructions to be given to said working apparatus from an operator and outputting instruction signals, said instruction portion being disposed at a location remote said working apparatus;

(b) detecting means for detecting said work circumstances of said working apparatus to output detection signals;

(c) computing means for supplying operating signals according to said instruction signals from said instructing portion to drive said working apparatus, and forming geometrical models of said working apparatus and said work circumstances according to said instruction signals from said instructing portion and said detection signals from said detecting means, said computing means being disposed at a location adjacent to said instruction portion; and

(d) display means for displaying said geometrical models formed by said computing means, said display means being disposed at a location adjacent to said instruction portion, thereby enabling an operator to input instructions into said instructing portion while monitoring said displayed geometrical models.

4,956,791

MERGING PATTERN-MATCHING NETWORKS INCLUDING RETES

Ho S. Lee, Mount Kisco, and Marshall I. Schor, Katonah, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Nov. 14, 1988, Ser. No. 272,097
Int. Cl.[5] G06F *15/18*
U.S. Cl. 364—513 **17 Claims**

1. In a machine-effected method of operating a pattern matching network;

including the machine-executed steps of:

arranging the pattern-matching network of a plurality of pattern-matching nodes into a plurality of rule-defined logic paths extending through the network from an input side to an output side;

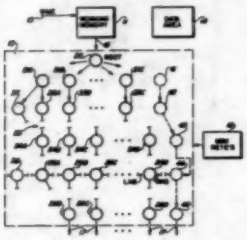
arranging the network for a logic flow of pattern matching operations through said logic paths from said input side toward a logical lower output side, assigning certain ones of said nodes as input nodes to the logic paths and other ones of said nodes as output nodes of such paths at said output side;

establishing and logically connecting in said pattern-matching network a plurality of pattern matching modules each of which have a plurality of said pattern-matching nodes for respectively receiving and supplying pattern-matching information items from and to predetermined ones of said pattern matching nodes logically outside of the modules and within said network for sharing pattern-matching information with pattern-matching nodes outside of the modules;

in said network outside of the respective modules, designating a one of the nodes as a source node for the respective modules;

creating and maintaining pointer constructs respectively pointing to the designated source nodes and to said modules; and

operating the pattern-matching network to include or exclude predetermined ones of said modules in or out of a given pattern-matching operation, including accessing the included modules via said respective pointer constructs.

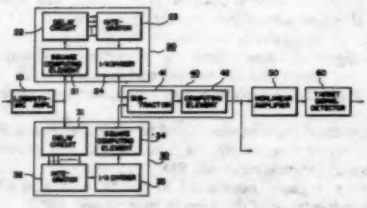


4,956,792

TARGET SIGNAL DETECTING APPARATUS

Matsuo Sekine, 3-3-37 Ogawa, Machida-shi, Tokyo, Japan

Continuation of Ser. No. 195,372, May 12, 1988, abandoned, which is a continuation of Ser. No. 65,113, Jun. 23, 1987, abandoned, which is a continuation of Ser. No. 755,581, Jul. 16, 1985, abandoned. This application May 23, 1989, Ser. No. 356,616
Claims priority, application Japan, Jul. 19, 1984, 59-148529
Int. Cl.[5] G01S *7/28, 7/66*
U.S. Cl. 364—517 **24 Claims**



1. A target signal detecting apparatus comprising: logarith-

mic transformation means for logarithmically transforming a received signal X having an amplitude intensity distribution which follows Weibull distribution having a probability density function Pc(x) given by the expression:

$$\frac{c}{b}\left(\frac{x}{b}\right)^{c-1}\exp\left[-\left(\frac{x}{b}\right)^{c}\right],$$

where b and c are constants which are determined by the nature of said received signal;

mean-square value computing means for calculating a mean-square value computing means for calculating a mean-square value $\langle y^2\rangle$ of an amplitude of said logarithmically transformed received signal $y=\ln x$; square value computing means for calculating a square value $\langle y\rangle^2$ of the mean of said logarithmically transformed received signal; distributed parameter computing means for calculating a distributed parameter E in accordance with said mean square value $\langle y^2\rangle$ and said square value $\langle y\rangle^2$ of said mean, where E follows the expression:

$$\frac{\pi}{\sqrt{6}}\cdot\frac{1}{\sqrt{\langle y^2\rangle-\langle y\rangle^2}}\text{; and}$$

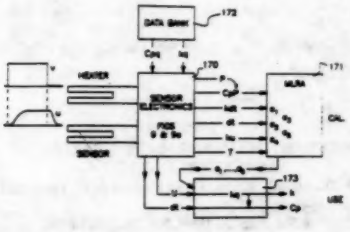
target signal detecting means for comparing said calculated distributed parameter E with a predetermined threshold to detect a target signal when said distributed parameter E is greater than said threshold.

4,956,793

METHOD AND APPARATUS FOR MEASURING THE DENSITY OF FLUIDS

Ulrich Bonne, Hopkins, and Steven D. James, Edina, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 24, 1988, Ser. No. 211,014
Int. Cl.[5] G01N 9/00
U.S. Cl. 364—558 **25 Claims**



1. Apparatus for determining specific gravity, ρ, of a fluid of interest comprising:

electrical resistance heater means;

thermal sensor means in proximate position to said heater means and in thermal communication therewith through the fluid of interest, the thermal sensor means having an output dependent on thermal sensor temperature;

adjustable electrical energizing means connected to said heater means for energizing said heater means on a time and level-variable pulse basis in a manner to induce both transient and substantially steady-state elevated temperature condition intervals in said thermal sensor means;

means for adjusting level and duration of the output of the adjustable electrical energizing means;

first output means for providing a first output signal indicative of a temperature of said thermal sensor means;

timing means for determining a rate of change of temperature of said temperature sensor during a transient temperature interval based on time variation of said first output signal between at least two known values;

means for determining k of the fluid of interest based upon said first output signal at steady-state elevated sensor temperature; and

means for determining c_p of the fluid of interest based on k and the rate of change of the first output signal during a transient temperature condition;

means for producing signals indicative of the values of k and c_p of the fluid of interest;

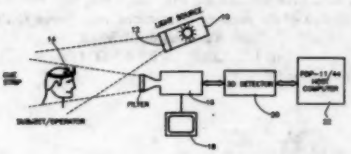
conversion means for converting signals indicative of the values of k and c_p of the fluid of interest to values indicative of ρ of the fluid of interest.

4,956,794

SINGLE CAMERA THREE DIMENSIONAL HEAD POSITION SENSING SYSTEM

Yehoshua Zeevi, and Oliver Hilsenrath, both of Haifa, Israel, assignors to Technion Research and Development Foundation Ltd., Haifa, Israel

Continuation of Ser. No. 3,113, Jan. 14, 1987, abandoned. This application Oct. 16, 1989, Ser. No. 423,539
Claims priority, application Israel, Jan. 15, 1986, 77610
Int. Cl.[5] G06G 7/48; G09G 3/02; G01B 11/26
U.S. Cl. 364—559 **28 Claims**



23. A head position detector system comprising:

cue definition means carrying cues thereon and arranged to be securely mounted on a head of a subject, a position of which is to be monitored;

a single camera arranged to view said cues of the cue definition means;

cue detection means receiving an output of said camera; and

memory means for storing updated cue addresses for providing an output indication of the head position to a utilization apparatus,

said cue definition means comprising three cues located along imaginary circle and being angularly spaced from each other, said imaginary line having its center located at the center of the head to be monitored.

4,956,795

SIGNAL CONDITIONERS

Kenji Yamaguchi, and Yohta Furukawa, both of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Filed Sep. 20, 1988, Ser. No. 246,289
Claims priority, application Japan, Feb. 4, 1988, 63-24671; Feb. 12, 1988, 63-30609
Int. Cl.[5] G06F 15/20
U.S. Cl. 364—571.03 **11 Claims**

1. A signal conditioner comprising

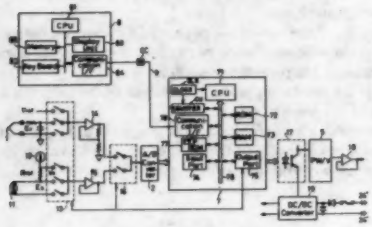
an A/D converter for converting a signal transmitted from a sensor into a digital signal;

arithmetic means for performing a predetermined arithmetic operation on said digital signal;

pulse outputting means for outputting a pulse signal with a duty ratio corresponding to an arithmetic result obtained by said arithmetic means;

smoothing means for smoothing said pulse signal and for outputting said pulse signal as a predetermined standard signal; and

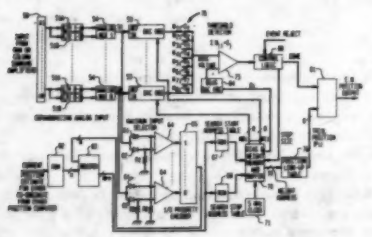
setting means for setting data used for said arithmetic operation by said arithmetic means and for outputting conditions of said pulse outputting means on receiving a signal from a source external to said signal conditioner.



4,956,796
MULTIPLE SENSOR POSITION LOCATING SYSTEM

W. Leslie Rogers, and Neal H. Clinthorne, both of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 876,762, Jun. 20, 1986, Pat. No. 4,852,056. This application May 20, 1988, Ser. No. 196,928
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.[5] G06F *15/20*; G01T *1/20*
U.S. Cl. 364—581 19 Claims



1. A system for locating a position of a source of a detectable emittance, the system comprising:

a plurality of sensors arranged in a predetermined multi-dimensional configuration with respect to one another, each for detecting the detectable emittance and producing at an associated output thereof a respective sensor signal having a sensor signal value which is substantially responsive to the detectable emittance impinging on said associated sensor, each of said sensors in said predetermined multi-dimensional configuration having associated therewith respective first dimension and second dimension coordinate addresses for defining a location of said respective sensors in said predetermined multi-dimensional configuration;

memory means for storing a plurality of weighting values for respective ones of said sensors, said weighting values being responsive to response characteristics of said respective sensors;

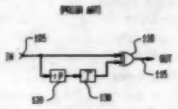
arithmetic combiner means for receiving a plurality of weighting values from said memory means corresponding to a respective plurality of said sensor means having a common first dimension coordinate address selected in response to a second dimension coordinate address, for producing at an output thereof a composite weighting signal having a composite weighting signal value responsive to said plurality of weighting values; and

position encoder means for producing a position value responsive to said composite weighting signal value.

4,956,797
FREQUENCY MULTIPLIER

Paul M. Berard, Phoenix, Ariz., assignor to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Jul. 14, 1988, Ser. No. 219,511
Int. Cl.[5] G06F *7/52*; H03K *23/64*
U.S. Cl. 364—703 6 Claims



1. A frequency multiplier, for producing an output signal having a frequency greater than the frequency of an input signal by a factor (1+N/M), where N and M are positive integers greater than 1, and N≦M, comprising:

an input terminal and an output terminal; and

a plurality of frequency multiplying stages, coupled in series between said input and output terminals, each stage having a stage input and a stage output, wherein each stage input is coupled to said input terminal or a stage output of a preceding stage, and each stage output is coupled to a stage input of a succeeding stage or said output terminal, and each stage including circuitry of a similar structure producing a stage output signal having a frequency greater than the frequency of its stage input signal by a stage multiplier factor having the general form (1+1/P), where P is any positive integer greater than 1,

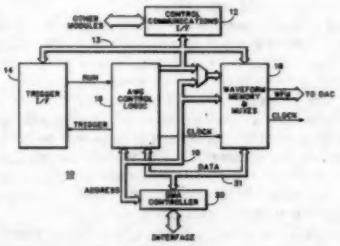
wherein the series multiplication of the stage multiplier factors of said plurality of frequency multiplier stages produces the output multiplier factor 1+N/M, and each stage multiplier factor corresponds to one factor or a subset of factors on the right hand side of the following series multiplication equation:

$$1 + N/M = \prod_{j=0}^{N-1} (1 + 1/(M + j)).$$

4,956,798
ARBITRARY WAVEFORM GENERATOR WITH ADJUSTABLE SPACING

Bryan J. Dinteman, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 3, 1989, Ser. No. 389,076
Int. Cl.[5] G06F *1/02*, *101/00*
U.S. Cl. 364—718 13 Claims



1. An arbitrary waveform generator of the type having

waveform segments stored in a memory and having a desired waveform represented by a plurality of packet data words, each packet data word having a plurality of elements, comprising:

means for storing each element, one element being a clock control word;

means for generating a sequence of addresses for the memory to access a particular waveform segment determined by each packet data word according to the elements in the storing means, the rate at which the sequence of addresses is generated being determined by a clock signal; and

means for varying a clock frequency for each packet data word according to the clock control word to produce the clock signal so that the duration of each waveform segment is adjusted to produce the desired waveform.

4,956,799

TRIGONOMETRIC FUNCTION ARITHMETIC PROCESSOR USING PSEUDO-DIVISION

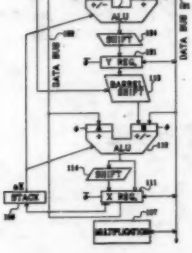
Takashi Nakayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 213,869, Jun. 30, 1988, abandoned. This application Oct. 27, 1989, Ser. No. 428,035

Claims priority, application Japan, Jun. 30, 1987, 62-164460; Sep. 18, 1987, 62-234195

Int. Cl.[5] G06F 1/02

U.S. Cl. 364—729 4 Claims



1. A trigonometric function arithmetic processor for use in computers for computing the values of trigonometric function sin θ and cos θ, with a resolution of n bits (where n=2m and m is positive integer), comprising:

a bus to which an input angular data of θ is supplied in the form of a binary floating-point number;

an exponent processing means coupled to said bus for receiving an exponent i (where i=integer) of said angular data and for incrementing its output k in the order of i, i+1, i+2, . . . , m−1 and then decrementing its output k in the order of m, m−1, m−2, . . . , i+1;

constant memory means coupled to said bus for storing a constant 1/K where

$$K = \prod_{k=0}^{n-1} \sqrt{(1 + 2^{-2k})}$$

and a sequence of constants $\Gamma_k = 2^k \times arctan\ (2^{-k})$ where k=i, i+1, i+2, . . . , m−1;

first register means coupled to said bus for receiving a mantissa V_k of said angular data;

stack means coupled to said first register means for receiving a sign data of said mantissa of said angular data stored in said first register means;

first adder/subtracter means having a first input connected to said first register means and a second input coupled to said bus for receiving a constant Γ_k from said constant memory means, said first adder/subtracter means being controlled by an output of said stack means so that when said sign data indicates positive said first adder/subtracter means executes subtraction of said second input from said first input, and when said sign data indicates negative said first adder/subtracter means executes addition between said first and second inputs, this addition/subtraction of said first adder/subtracter means being repeatedly performed each time said output k of said exponent processing means is incremented in the order of i, i+1, i+2, . . . , m−1;

first shifter means coupled to an output of said first adder/subtracter means for writing a doubled value of said output of said first adder/subtracter means to said first register means each time said output k of said exponent processing means is incremented, so that each time said output k of said exponent processing means is incremented, said first register means is written with $V_{k+1} = 2(V_k - a_k \times \Gamma_k)$ where a_k is a sign data given by said stack means, a content Vm of said first register means obtained when said output k of said exponent processing means has been incremented to m−1 being used as an initial value X_k;

multiplication means coupled to said bus for receiving said constant 1/K from said constant memory means and said content Vm of said first register means obtained when said output k of said exponent processing means has been incremented to m−1, for generating a product Vm/K;

second register means coupled to said bus for receiving, as an initial value Y_k, said product Vm/K generated by said multiplication means;

second adder/subtracter means having a first input connected to said first register means and a second input coupled to said bus for receiving said initial value Y_k from said second register means, said second adder/subtracter means being controlled by said output of said stack means so that when said sign data indicates positive said second adder/subtracter means executes addition between said first and second inputs and when said sign data indicates negative said second adder/subtracter means executes subtraction of said first input from said second input;

second shifter means coupled to an output of said second adder/subtracter means for writing a halved value of said output of said second adder/subtracter means to said second register means each time said output k of said exponent processing means is decremented; and

barrel shift means coupled to said second shift register means for outputting 2^{-2k} times the value of the content of said second shift register means to said second input of said first adder/subtracter means;

so that when said output k of said exponent processing means is decremented in the order of m, m−1, m−2, . . . , i+1, said first and second adder/subtracter means being controlled by said output of said stack means so as to respectively add/subtract each time said output k of said exponent processing means is decremented, whereby, each time said output k of said exponent processing means is decremented, said first register means holds $X_{k-1} = X_k - a_k \times 2^{-2k} \times Y_k$ and said second register means holds $Y_{k-1} = (Y_k + a_k \times X_k)/2$, and finally, said first register means holds a value corresponding to cos Θ and said second register means holds a value corresponding to a mantissa of sin Θ.

4,956,800

ARITHMETIC OPERATION PROCESSING APPARATUS OF THE PARALLEL PROCESSING TYPE AND COMPILER WHICH IS USED IN THIS APPARATUS

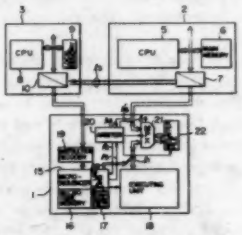
Masatsugu Kametani, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 208,107

Claims priority, application Japan, Jun. 19, 1987, 62-151207; Jul. 3, 1987, 62-165338

Int. Cl.[5] G06F 7/38

U.S. Cl. 364—736 13 Claims



1. An arithmetic operation processing apparatus of a parallel processing type, comprising:

a first processor having means for outputting a series of macro instruction sequences which are each obtained by dividing a whole executing sequence composed of multiple instructions to specify respective arithmetic operating processes;

a second processor connected to receive said series of macro instruction sequences from said first processor and including means for storing said multiple instructions of said whole executing sequence, and means coupled to said storing means for outputting instructions relevant to an arithmetic operating process of a macro instruction sequence in response to the receipt of each macro instruction;

an arithmetic operating unit for executing an arithmetic operation on data in accordance with an instruction received from said second processor; and

data transfer means for transferring necessary operand data and result data relevant to said arithmetic operations between said first processor and said arithmetic operating unit.

4,956,801

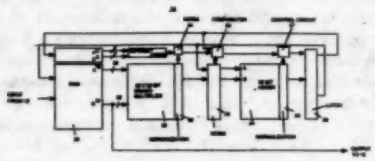
MATRIX ARITHMETIC CIRCUIT FOR PROCESSING MATRIX TRANSFORMATION OPERATIONS

Curtis Priem, Fremont, and Chris Malachowsky, Santa Clara, both of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.

Filed Sep. 15, 1989, Ser. No. 407,549

Int. Cl.[5] G06F 7/38

U.S. Cl. 364—748 6 Claims



1. In a data processing system, an improved matrix arithmetic circuit for processing matrix transformation operations, comprising:

random access memory means for receiving and storing a plurality of numbers in Modulo 256 with multiple tap points number format, said plurality of numbers being provided by an input conversion circuit coupled to said data processing system;

multiplier means coupled to said memory means for multiplying first and second of said numbers stored in said memory means in Modulo 256 format, to form a first result, said result including an exponent;

normalization means coupled to said multiplier means for normalizing said first result, said normalization means including shifting means for shifting said first result by eight bit increments as far to the left of the format space available as possible, and means for reducing said exponent of the result by one for each such shift;

adder means coupled to said normalization means for adding said normalized first result to a third number in Modulo 256 with multiple tap points number format to obtain a second result;

register means coupled to said adder means for receiving said second result and coupling said result to said memory means for storage, said second result also coupled to an output conversion circuit coupled to said data processing system.

4,956,802

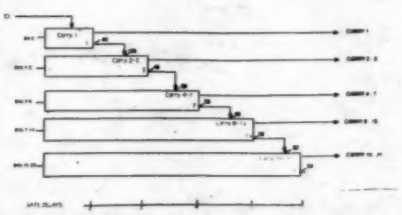
METHOD AND APPARATUS FOR A PARALLEL CARRY GENERATION ADDER

Curtis Priem, Fremont, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Dec. 14, 1988, Ser. No. 284,110

Int. Cl.[5] G06F 7/50

U.S. Cl. 364—787 6 Claims



1. A circuit to generate carry-out bits of a multi-bit sum of a first multi-bit input and second multi-bit input wherein each bit sum is derived from a bit from the first input, a bit from the second input, and a carry-in bit, said circuit comprising:

a first sub-circuit comprising components to compute a least significant carry-out bit, said least significant carry-out bit being equal to a carry-in bit to the circuit;

at least one second sub-circuit coupled to said first sub-circuit to compute carry-out bits more significant than the least significant carry-out bit, each of said second sub-circuits being organized according to binary ordered groups of input bits wherein a binary-ordered group is determined according to the equation $group_n$=input bits (2^n) through input bits ($2^{n+1}-1$), the number of said second sub-circuits being equal to the number of binary groups, each of said second sub-circuits being organized in a less significant to more significant order and comprising:

a carry-in bit to the second sub-circuit of a group, the value of the carry-in bit being the value of the carry-out bit computed by an adjacent less significant second sub-circuit;

a first group of components to compute a preliminary carry-out bit for the respective input bits, said first group of components organized to compute approximately concur-

rent with the components of said adjacent less significant second sub-circuit which computes the carry-in bit to the second sub-circuit, the number of gate delays required for the first group of components to compute being less than or equal to the number of gate delays required for the components of the less significant second sub-circuit to compute the carry-in bit; and

a second group of components coupled to the first group of components to compute the carry-out bit for the respective group of the input bits as the combination of the carry-in bit and the output of the first group of components, said output being equal to said preliminary carry out bit, said second group of components computing the carry-out bit in one gate delay;

wherein said second sub-circuit, to compute the carry-out bit for the respective input bits for the binary-ordered group, utilizes one gate delay more than the number of gate delays utilized to generate the carry-in bit to the second sub-circuit.

4,956,803

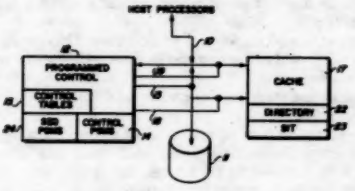
SEQUENTIALLY PROCESSING DATA IN A CACHED DATA STORAGE SYSTEM

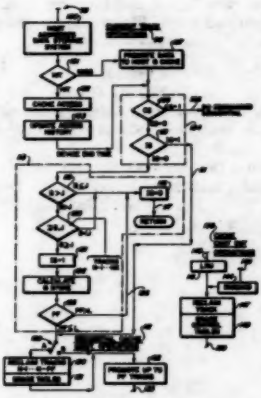
Gerald E. Taylor, Berthoud, Colo., and Robert E. Wagner, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 68,857, Jul. 2, 1987, Pat. No. 4,882,642. This application Sep. 14, 1989, Ser. No. 407,077

Int. Cl.[5] G06F 9/00

U.S. Cl. 364—900 13 Claims





1. Data processing apparatus including a cache store operatively connected between a host processor and a backing store, the backing store having addressable data storage tracks, both stores storing data addressable by the addresses of the backing store data storage tracks, each track being capable of storing an amount of data equal to a given number of data bits, the host processor accessing, or primarily accessing, the cache store for writing and reading data to and from both stores, and a cache controller determining the promotion and demotion of data between the cache and the backing store and arranged, in operation, to switch between promotion and demotion protocols in dependence on the result of a running analysis of the proportion of data in the currently accessed track and its connected previously accessed tracks actually refereneed in relation to predetermined thresholds, the controller, for each access to the cache store by the host processor, measuring the amount of data in that track that is referenced by the access as an indication of locality of reference and separately storing the measured amount as an access extent for that track or incorporating such there into and means for comparing the predetermined thresholds with the stored access extents for yielding a given result, and the controller having means responsive to the given result to control said promotion and demotion of data.

4,956,804

DATA PROCESSING SYSTEM WITH MEMORIES ACCESS TIME COUNTING AND INFORMATION PROCESSOR WAIT SIGNAL GENERATING CIRCUITRIES

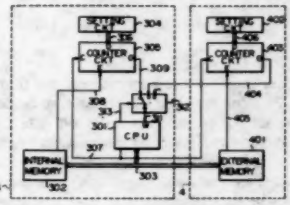
Koso Matsumoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 690,643, Jan. 11, 1985. This application Dec. 12, 1988, Ser. No. 282,890

Claims priority, application Japan, Jan. 20, 1984, 59-7057; Jan. 20, 1984, 59-7058

Int. Cl.[5] G06F 7/62, 9/02, 13/14, 15/08

U.S. Cl. 364—900 8 Claims



1. An electronic equipment comprising:

information processing means;

first memory means accessible by said information processing means;

first output means operatively responsive to said first memory means for outputting a first signal representing a rated access time of said first memory means;

second memory means accessible by said information processing means, said second memory means being detachable from said equipment;

second output means operatively responsive to said second memory means for outputting a second signal representing a rated access time of said second memory means;

wherein said second output means is detachable from said equipment; and

control means connected to said information processing means for controlling an operation of said information processing means in response to the first signal when said information processing means accesses said first memory means, and for controlling an operation of said information processing means in response to the second signal when said information processing means accesses said second memory means,

said control means including wait signal generating means for entering the first or second signal from said first or second output means, respectively, and for generating a wait signal for causing said information processing means to be in a wait condition, said wait signal having a waiting

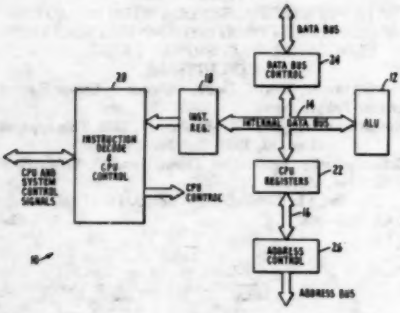
time period different in dependence upon the entered first or second signal,

said wait signal generating means including means for counting a time in response to the entered first or second signal, said time counting means sending the wait signal to said information processing means in accordance with a time count operation.

4,956,805
CIRCUITRY FOR CHARACTER TRANSLATE FUNCTIONS

L. Leslie Biffle, Cave Creek, and Chad R. Larson, Scottsdale, both of Ariz., assignors to Anasazi, Inc. and International Anasazi, Inc., both of Phoenix, Ariz.

Filed Sep. 22, 1987, Ser. No. 99,754
Int. Cl.[5] G06F *9/00*
U.S. Cl. 364—900 **20 Claims**



1. Character translate circuitry external to a central processing unit (CPU) for enabling character translation functions, wherein the CPU performs functions on data characters in response to referenced program instructions retrieved by the CPU from a main memory storage element, and wherein the CPU includes an arithmetic logic unit for performing the functions on the data characters, at least one internal storage register for storing a data character, a data bus for transmitting and receiving data characters, and an address bus connected between the CPU and the main memory storage element for providing referenced program instruction addresses to the main memory storage element, and wherein each referenced program instruction address includes an instruction address program comprising the data character stored in the at least one internal storage register, the character translate circuitry comprising:

(a) a character translation storage unit comprising a plurality of translation character storage locations and including address input means responsive to a translation storage location address for accessing a corresponding translation character storage location; and

(b) access means connected between the address bus and the character translation storage unit for providing the instruction address portion to the address input means as the storage location address,

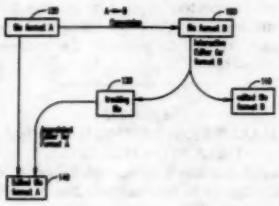
wherein the address bus comprises a most significant bit set and a low order bit set and the address input means comprises a least significant bit set and a remaining bit set, the most significant bit set being connected to the least significant bit set, the low order bit set being connected to the remaining bit set, the most significant bit set corresponding to the instruction address portion, and

wherein the translation character storage locations are divided into a plurality of tables, a table to be accessed being selected by the low order bit set, selection of the translation character storage location within the selected table being determined by the most significant bit set.

4,956,806
METHOD AND APPARATUS FOR EDITING SOURCE FILES OF DIFFERING DATA FORMATS USING AN EDIT TRACKING FILE

Andrew S. Crowe, Mountain View, and Daniel T. Lai, Fremont, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 12, 1988, Ser. No. 217,996
Int. Cl.[5] G06F *1/00*
U.S. Cl. 364—900 **12 Claims**



1. A method for editing source files containing audio information of differing data formats on a display using a plurality of edit commands, comprising the steps of:

(a) performing one of said plurality of edit commands on a source file containing audio information of a first data format;

(b) copying said performed edit command in a buffer;

(c) writing said edit command from said buffer to a tracking file; and

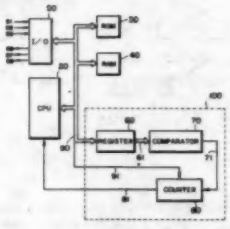
(d) repeating steps (a)–(c) for each of said plurality of edit commands;

(e) reading each of said written edit commands from said tracking file and replaying said read edit commands against at least one source file containing audio information having a second data format thereby effecting commensurate changes to the at least one source file having the second data format and creating an edit file corresponding to said source file having the first data format.

4,956,807
WATCHDOG TIMER

Akio Hosaka, Kanagawa, and Akito Yamamoto, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 16, 1983, Ser. No. 562,011
Claims priority, application Japan, Dec. 21, 1982, 57-222846
Int. Cl.[5] G06F *1/24*
U.S. Cl. 364—900 **8 Claims**



1. A watchdog timer for a computer, said computer alternately producing first and second periodic signals representative of first and second data which are different from one

another, each of said first and second data consisting of a plurality of bits, said watchdog timer comprising:

(a) a register receiving and storing said first and second data;

(b) means for comparing said first data stored in said register with a first reference data and for comparing said second data stored in said register with different second reference data and producing an output signal only when the pairs of compared data coincide;

(c) means for generating clock pulses; and

(d) means for counting the clock pulses from said clock generating means and for producing a reset signal to said computer when the count of said counting means reaches a predetermined value, said counting means being reset by the output signal of said comparing means, and the time interval required for said counting means to count to the predetermined value being longer than the interval of occurrence of said output signal of said comparing means while said computer operates in a normal state.

4,956,808

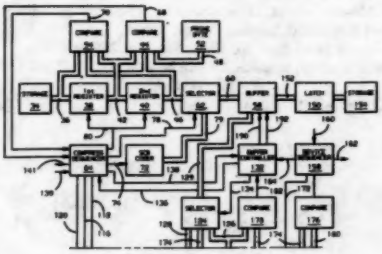
REAL TIME DATA TRANSFORMATION AND TRANSMISSION OVERLAPPING DEVICE

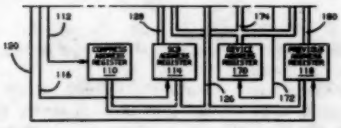
David E. Aakre, Kasson; Roy L. Hoffman, Pine Island; David N. Moen, and Quentin G. Schmierer, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 689,545, Jan. 7, 1985, abandoned. This application May 20, 1987, Ser. No. 54,111

Int. Cl.[5] G06F 5/06

U.S. Cl. 364—900 20 Claims





1. Real time data transformation and transmission apparatus for overlapping transformation of blocks of data provided from a first data medium which has a selected data transfer rate and transmission of the transformed blocks of data to a second data medium which has a selected data receiving rate, said apparatus comprising:

transformation means coupled to the first data medium for transforming blocks of data received from the first data medium into variable size blocks of transformed data and providing said transformed data of an irregular rate;

buffer means coupled to the transformation means and to the second data medium for storing the transformed data and transmitting the transformed data to the second data medium; and

control means coupled to the transformation means and to the buffer means for controlling the transformation means to provide transformed data to the buffer means as a function of the amount of data in the buffer means and controlling the buffer means to transmit the transformed data to the second data medium as a function of the data receiving rate of the seond data medium provided that the buffer means contains a predetermined amount of data sufficient to ensure that each block of transformed data is transmitted to the second data medium continuously at the data receiving rate of the second data medium.

4,956,809

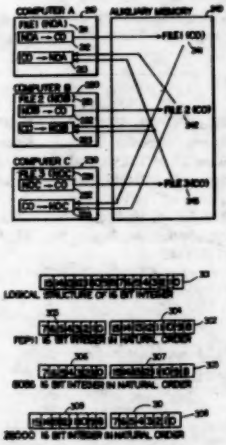
METHOD FOR CANONICAL ORDERING OF BINARY DATA FOR PORTABLE OPERATING SYSTEMS

Johann George, Holland Landing, Canada; Trevor J. Thompson, New Providence, N.J.; David G. Conroy, Maynard, Mass., and Frederick H. Tudor, Evanston, Ill., assignors to Mark Williams Company, Chicago, Ill.

Continuation of Ser. No. 934,341, Nov. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 391,223, Jun. 23, 1982, abandoned. This application Dec. 29, 1988, Ser. No. 291,348

Int. Cl.[5] G06F 9/00

U.S. Cl. 364—900 5 Claims



1. A method for use with a portable operating system used on different computers which use different binary structures, whereby files containing binary data become portable, comprising the steps of:

by means of a computer, representing in a standardized order consisting of a standard binary structure files stored on auxiliary memory or transported on a communications means, said standardized order being different from a natural order used on at least one of the different computers;

converting in each of the different computers binary data read from auxiliary data storage or communications means from the standardized order to the natural order of the respective host computer after said binary data are read from said auxiliary data storage or communications means and before said binary data are used by the respective host computer; and

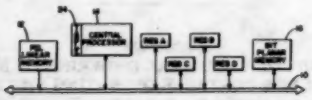
converting in each of the different computers binary data written into auxiliary data storage or communications means from the natural order of the respective host computer to the standardized order prior to said writing.

4,956,810

HIGH SPEED METHOD FOR DATA TRANSFER

Arthur M. Sherman, Morgan Hill, and Peter C. Yanker, Portola Valley, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 6, 1988, Ser. No. 242,326
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—900 **12 Claims**



1. A method for transferring data units a serially organized memory to a bit-planar organized memory, the method comprising:

selecting a plurality of data units from said serially organized memory;

capturing a bit pattern from said plurality of data units, said bit pattern including only bits to be stored in a subset of storage planes in said bit planar organized memory;

isolating from said bit pattern, subsidiary bit patterns, each said subsidiary bit pattern to be stored in one storage plane of said subset of storage planes; and

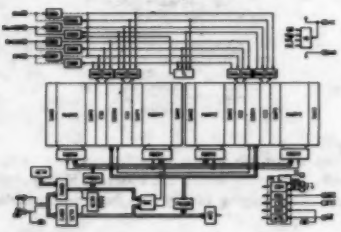
translating each said subsidiary bit pattern into a form suitable for storage in a plane of said bit planar organized memory.

4,956,811

SEMICONDUCTOR MEMORY

Kazuhiko Kajigaya; Hiroaki Kotani; Kazuyoshi Oshima; Yasuhiro Kasama, all of Tokyo, and Shinji Udo, Akishima, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Jul. 4, 1988, Ser. No. 228,228
Claims priority, application Japan, Sep. 16, 1987, 62-231640; Sep. 16, 1987, 62-231641
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—51 **5 Claims**



1. A semiconductor memory having a plurality of operating modes comprising:

a plurality of common data lines for delivering information data from plurality memory cells;

a plurality of amplifier circuits which provide output signals in accordance with data received from said common data lines, respectively;

a plurality of output circuits, each of which has a first input terminal for receiving each output signal of said plurality of amplifier circuits, respectively;

a plurality of pads being provided which correspond to said plurality of output circuits;

a logic circuit which has a plurality of input terminals for receiving output signals of said plurality of amplifier circuits and has an output terminal for delivering one of said output signals to a second input terminal of a predetermined one of said plurality of output circuits, wherein said predetermined output circuit includes first connecting means coupled either between said first input terminal and an output terminal of said predetermined output circuit or between said second input terminal and said output terminal of said predetermined output circuit;

second connecting means coupled between said output terminal of said predetermined output circuit and said corresponding pad; and

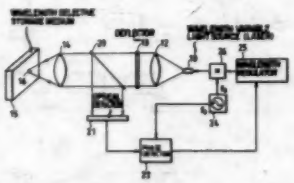
a timing generator which has an input terminal coupled to an input pad and has an output terminal for delivering control signals in accordance with a predetermined one of said operating modes, wherein said input pad serves to connect to a predetermined voltage selectively for specifying said predetermined one of said operating modes.

4,956,812

WAVELENGTH SELECTIVE OPTICAL RECORDING AND REPRODUCING DEVICE

Masatomo Seya; Kazuo Okada; Motomu Yoshimura, and Mitsuo Maeda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 20, 1988, Ser. No. 209,213
Claims priority, application Japan, Jun. 19, 1987, 62-154126
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—119 **4 Claims**



1. A wavelength selective optical recording and reproducing device comprising:

a light source having a variable wavelength;

a recording and reproducing medium for storing information, said information being selectively retrieved according to the wavelength of light;

an optical system for condensing light from said light source and illuminating said medium;

optical detector means for detecting light from said medium, said optical detector producing a data signal when the detected light is at a predetermined wavelength;

a frequency generator producing a constant frequency signal;

phase detector means receiving said constant frequency signal and said data signal and producing a phase difference signal in response thereto;

controller means receiving said phase difference signal and being controlled thereby to produce an output; and

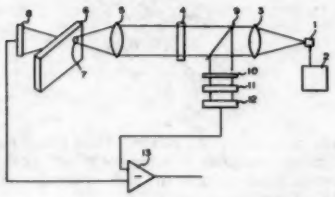
adder means connected to said light source for adding said constant frequency signal to the output of said controller to produce a signal for controlling the wavelength of said light source.

4,956,813

APPARATUS FOR REGENERATING INFORMATION FROM RECORDS MADE BY OPTICAL-WAVELENGTH-MULTIPLEXING METHOD

Masatomo Seya, and Kazuo Okada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,897
Claims priority, application Japan, Jul. 15, 1987, 62-177726
Int. Cl.[5] G11C 13/04
U.S. Cl. 365—127 11 Claims



1. An apparatus for regenerating information from records made by an optical-wavelength-multiplexing method, comprising, in combination:

a variable wavelength light source for issuing light of a desired wavelength;

beam splitting means for separating the light from said light source into first and second components thereof;

storage means, which data can be recorded on and reproduced from by the optical-wavelength-multiplexing method, for receiving the first component of the light from said light source and for recording data thereon by producing a "spectral hole" at the wavelength of the received first component of the light and for further reflecting the first component of the light from said source or letting the first component transmit therethrough after the recording of the data;

first detecting means for detecting the component of the light reflected or transmitted by said first storage means and for producing a first output signal representing data bit whether significant data is present at the wavelength of the first component of the light projected onto said storage means;

reference means, which has the same intensity-wavelength characteristic as that of said storage means and which data can be recorded on and reproduced from by the optical-wavelength-multiplexing method, for receiving the second component of the light from said light source and for reflecting the second component of the light from said source or letting the second component transmit therethrough;

second detecting means for detecting the second component of the light reflected or transmitted by said reference means and for producing a second output signal; and

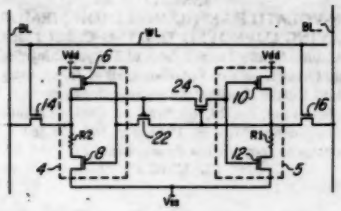
arithmetic logic circuit means for receiving the first and second output signals and for subtracting the level of the first output signal from that of the second output signal to provide a "reproduced signal" representing the data bit and reference to a constant ground level.

4,956,814

MEMORY CELL WITH IMPROVED SINGLE EVENT UPSET RATE REDUCTION CIRCUITRY

Theodore W. Houston, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 30, 1988, Ser. No. 252,200
Int. Cl.[5] G11C 11/40
U.S. Cl. 365—154 12 Claims



1. A bi-stable logic device comprising:

a set of cross-couple inverters, said set of inverters including first and second inverters, each inverter including a n-channel transistor and a p-channel transistor, the gate of the n-channel transistor being connected to the gate of the p-channel transistor;

a device connected to and between the drains of said p-channel and n-channel transistors of at least one inverter, said device being capable of providing at least a selected level of impedance between said drains of said p-channel and n-channel transistors; and

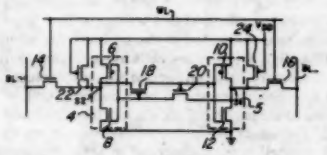
a pair of transistors, each having a gate, first and second terminals, connected to the cross-coupling of the inverters so as to provide a time delay in effecting voltage changes at selected nodes within the cell via an impedance path through said pair of transistors which lies between said selected nodes, the gate of a first transistor of said pair being connected to a first terminal of a second transistor of said pair in addition to the gate of a second transistor of said pair being connected to a first terminal of said first transistor.

4,956,815

MEMORY CELL WITH INCREASED STABILITY

Theodore W. Houston, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 30, 1988, Ser. No. 252,291
Int. Cl.[5] G11C 11/40
U.S. Cl. 365—154 12 Claims



1. A bi-stable logic device comprising:

a set of cross-coupled inverters, said set of inverters including first and second inverters;

a pair of transistors connected to the cross-coupling of the inverters so as to provide a time delay in effecting voltage changes at selected nodes within the cell via an impedance path through said transistors which lies between said selected nodes, each of said transistors including a gate, first and second terminals, the gate of a first transistor of said pair being connected to said first terminal of a second transistor of said pair in addition to the gate of a second

transistor of said pair being connected to a first terminal of said first transistor; and

a current compensation device, connected to each inverter, operable to supply current in response to ionizing radiation in a direction opposite to that required to change the state of the device.

4,956,816

NON-VOLATILE SEMICONDUCTOR MEMORY HAVING IMPROVED TESTING CIRCUITRY

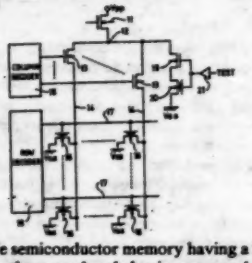
Shigeru Atsumi; Sumio Tanaka, both of Tokyo; Shinji Saito, and Nobuaki Otsuka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 29,763, Mar. 24, 1987, abandoned. This application May 30, 1989, Ser. No. 358,482

Claims priority, application Japan, Mar. 31, 1986, 61-71143

Int. Cl.[5] G11C *29/00*

U.S. Cl. 365—201 **3 Claims**



1. A non-volatile semiconductor memory having a first node and a second node, the second node having a ground potential, comprising:

a plurality of non-volatile memory cells each having a drain, a floating gate, a control gate, and a threshold potential, wherein data is written into a selected cell when the drain potential of the selected cell is at a predetermined normal writing voltage and a select signal is applied to the control gate of the selected cell;

a plurality of bit lines, each memory cell being connected between one of the bit lines and said second node, each of said bit lines transferring data to and from associated memory cells;

write voltage means for generating a first signal having the predetermined normal writing voltage and for supplying the first signal to the drain of at least one non-volatile memory cell when data is written into said at least one non-volatile memory cell;

test voltage means for generating a second signal having a voltage equivalent to the predetermined normal writing voltage and for supplying the second signal to the drain of each non-volatile memory cell to simultaneously test all of the memory cells, said test voltage means including:

circuit means, connected to the bit lines, for simultaneously testing all of the memory cells by supplying to the drain of each memory cell said second signal to detect changes in the threshold potential of each memory cell,

said circuit means including a select transistor and a dummy cell, the select transistor of the circuit means and the dummy cell being connected in series between the first node and the second node.

4,956,817

HIGH DENSITY DATA STORAGE AND RETRIEVAL SYSTEM

Paul E. West, Glendale, and Jamshid Jahanmir, Pomona, both of Calif., assignors to QuanScan, Inc., Pasadena, Calif.

Filed May 26, 1988, Ser. No. 199,008

Int. Cl.[5] G11C *13/00*

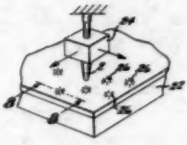
U.S. Cl. 365—189.01 **33 Claims**

1. A random access memory which comprises:

a memory medium, said memory medium including a portion of said medium which is formed to be essentially planar;

an underlying structure, said structure providing means to mount said memory medium and other elements of said random access memory in a fixed relationship to one another;

a probe, said probe capable of movement in a plane parallel to said planar portion of said memory medium, said probe spaced apart from said medium a distance such that the variations in surface smoothness of said planar portion are small compared to the distance between said probe and said planar portion;



means to move said probe parallel to said planar portion of said memory medium to a predetermined location over said memory medium on the basis of an input related to said predetermined location;

means to locate the actual position of said probe relative to a fixed location on said planar portion of said memory medium; and

means to determine the binary logic state of a location on said memory medium on the basis of emissions caused when a voltage differential from a power source is applied between said probe and said medium and the gap between said probe and said medium is maintained between 20 and 1000 angstroms to effect either Schottky and/or Field emissions between said probe and said memory medium.

4,956,818

MEMORY INCORPORATING LOGIC LSI AND METHOD FOR TESTING THE SAME LSI

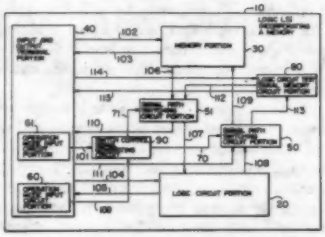
Kazumi Hatayama, and Terumine Hayashi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,913

Claims priority, application Japan, Oct. 2, 1987, 62-249162

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—189.08 **12 Claims**



1. A memory incorporating logic LSI comprising:

an input and output terminal portion, which is capable of interfacing to an exterior of the LSI and which receives input and transmits output signals;

a memory portion, to and from which information is written and read out from the LSI, respectively, through said input and output terminal portion;

a logic circuit portion, which determines an output signal

according to a predetermined logic, responding to an input signal;

a first signal path, through which a first signal is transmitted from said logic circuit portion to said memory portion;

a second signal path, through which a second signal is transmitted from said memory portion to said logic circuit portion;

operation mode input circuit portions, which input a plurality of operation mode signals, that determine the operational state of said memory incorporating logic LSI, via said input and output terminal portion;

a memory test input signal path, connected to said input and output terminal portion and through which an input signal for memory test, which is inputted from said input and output terminal portion, is transmitted to said memory portion;

a memory test output signal path, through which an output signal for memory test which is an output of said memory portion, is transmitted to said input and output terminal portion; and

a signal path switching circuit portion disposed in said first signal path, which transmits said input signal for memory test from said memory test input signal path to said memory portion by switching off said first signal path from said logic circuit portion to said memory portion on the basis of said operation mode signals.

4,956,819

CIRCUIT CONFIGURATION AND A METHOD OF TESTING STORAGE CELLS

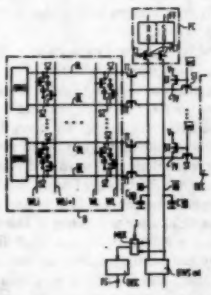
Kurt Hoffmann, Taufkirchen; Hans-Dieter Oberle, Puchheim; Rainer Kraus, Munich, and Oskar Kowarik, Grafing, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 16, 1988, Ser. No. 168,653

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708534

Int. Cl.[5] G11C *29/00*

U.S. Cl. 365—201 **9 Claims**



1. A circuit configuration for testing storage cells of an integrated semiconductor memory which includes a block in which the storage cells are disposed in the form of a matrix, word lines and internal bit lines for driving the storage cells, evaluator circuits each being assigned to a respective internal bit line, each internal bit line having first and second mutually complementary bit line halves, a pair of first and second external bit lines, transfer transistors connecting the first external bit line to each of the first internal bit line halves and connecting the second external bit line to each of the second internal bit line halves, and a bit line decoder assigned to the respective internal bit lines and connected to gates of the transfer transistors;

the circuit configuration comprising a precharge device connected to said pair of external bit lines for precharging the pair of external bit lines to two mutually-complementary logic levels in a test mode, a discriminator circuit having means for sensing potentials, being connected to the pair of external bit lines and having an output for generating a fault signal indicating the occurrence of faults in test operation, the gates of all of the transfer transistors carrying a control potential, said fault signal being generated when the external bit line precharged to the higher level falls in level to at least a value which corresponds to the magnitude of a control potential on the gates of the transfer transistors minus a threshold voltage of the transfer transistors when data is read out from the memory cells during a test mode.

4,956,820

ARBITER CIRCUIT FOR ESTABLISHING PRIORITY CONTROL OF READ, WRITE AND REFRESH OPERATIONS WITH RESPECT TO MEMORY ARRAY

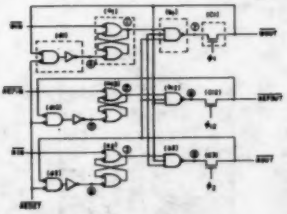
Masashi Hashimoto, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 26, 1988, Ser. No. 161,059

Claims priority, application Japan, Mar. 11, 1987, 62-56117

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—222 **7 Claims**



1. An arbiter circuit for providing priority control of dynamic memory operations in determining the order in which dynamic memory access signals such as write, read and refresh signals are executed, said arbiter circuit comprising:

first circuit holding means comprising a plurality of holding circuits for temporarily holding dynamic memory access signals and corresponding to write, read and refresh request signals respectively, each of said holding circuits having an input for receiving the one of said write, read and refresh request signals corresponding thereto;

second circuit inhibiting means comprising a plurality of inhibit logic gates for inhibiting transfer of a dynamic memory access signal when another dynamic memory access signal is already being executed and corresponding to write read and refresh request signals respectively, each of said inhibit logic gates having a plurality of inputs, one of said inputs for each said inhibit logic gate being connected to the output of a corresponding one of said plurality of holding circuits;

third circuit synchronizing means comprising a plurality of synchronizer switches for synchronizing individual dynamic memory access signals and corresponding to write, read and refresh request signals respectively, each of said switches being connected to the output of a corresponding one of said inhibit logic gates and being respectively respective to a synchronizing signal for transmitting an output signal from said inhibit logic gate corresponding thereto as a memory access signal for one of the write, read and refresh functions;

fourth circuit reset means comprising a plurality of reset logic gates for resetting the arbiter circuit upon the end of each dynamic memory access signal and corresponding to write, read and refresh request signals respectively, each of said reset logic gates having a plurality of inputs, and one of said inputs of each of said reset logic gates begin adapted to receive a reset signal for application of said

reset signal to each of said reset logic gates simultaneously; and

a plurality of feedback lines respectively connected at one end thereof at the output of a synchronizer switch and at its other end to another input of said reset logic gate for each circuit arrangement corresponding to said write, read and refresh request signals respectively, said plurality of feedback lines including

a first feedback line associated with said write request signal and being connected to inputs of said inhibit logic gates associated with said refresh and said read request signals,

a second feedback line associated with said refresh request signal and being connected to inputs of said inhibit logic gates associated with said write and said read request signals, and

a third feedback line associated with said read request signal and being connected to inputs of said inhibit logic gates associated with said write and said refresh request signals.

4,956,821

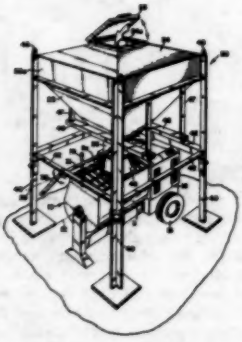
SILO AND DELIVERY SYSTEM FOR PREMIXED DRY MORTAR BLENDS TO BATCH MIXERS

Terrance P. Fenelon, 173 Montrose Pl., St. Paul, Minn. 55104

Filed Oct. 12, 1989, Ser. No. 420,335

Int. Cl.[5] B28C *7/04*

U.S. Cl. 366—8 **17 Claims**



1. A portable silo for storing and delivering premixed dry mortar-blend materials to an inlet port of a portable batch mixer apparatus of the type used at a construction site, comprising:

(a) a silo chassis defining an inner cavity for retainably storing a charge of premixed dry mortar-blend material, comprising:

(i) a sidewall portion extending between upper and lower ends and peripherally defining said inner cavity;

(ii) upper wall means cooperatively engaging said sidewall portion upper end for closing the inner cavity at its upper end, said upper wall means defining an inlet port opening into said inner cavity; and

(iii) lower wall means for closing the inner cavity at its lower end, said lower wall means defining an outlet port opening into said inner cavity;

(b) inlet means cooperatively connected with said upper wall means for selectively providing sealed closure and open access to said inner cavity through said inlet port;

(c) discharge means cooperatively connected with said lower wall means for selectively providing sealed closure and open access to said inner cavity through said outlet port; said discharge means being operable between closed and open positions; said discharge means when in said closed position being operable to sealingly close said outlet port of the inner cavity to prevent mortar-blend material within said inner cavity from passing through said outlet port and being operable between said closed and said open positions to enable measured amounts of mortar-blend material within said inner cavity to pass by gravity through said outlet port; and

(d) leg means operatively connected with said chassis for elevating said chassis above a support surface such that said discharge means operatively overlies an inlet port of a portable batch mixer supported by said support surface, said leg means being arranged and configured to allow the portable batch mixer to operatively stand therebetween; whereby material leaving said inner cavity through said discharge means falls by gravity into the inlet port of the batch mixer.

4,956,822

METHOD AND APPARATUS FOR SEISMIC EXPLORATION

Harold P. Barber, 3143 Cypress Point, Missouri City, Tex. 77459; Clyde Lee, 6321 Del Monte, Houston, Tex. 77057, and Paul J. Ruckman, 509 W. Hillary, Sugar Land, Tex. 77478

Filed Dec. 9, 1988, Ser. No. 281,669

Int. Cl.[5] G01V *1/38*

U.S. Cl. 367—23 **13 Claims**

10. An apparatus for producing a seismic signal in a marine environment when towed behind a vessel and located below the surface of a body of water, including:

a support frame;

means for securing said support frame to a towing line from the vessel;

means for locating said support frame at a desired depth in the range of 1 to 3 meters below the water surface;

a plurality of air guns;

means for operably mounting each of said air guns with said support frame for forming an array;

said plurality of air guns forming said array arranged on said support frame in two parallel vertical planes with each vertical plane axis having four air guns disposed therein;

each of said vertical planes having positioned therein a first air gun and a second air gun with said first and second air guns space apart a distance of substantially 10 feet in a horizontal plane containing said first and second air guns;

each of said vertical planes having a third air gun and a fourth air gun positioned therein and disposed substantially midway between said first air gun and said second air gun, said third and fourth air gun being spaced apart a vertical distance of substantially 20 inches and located substantially equidistant from said horizontal plane containing said first and second air guns.

4,956,823

SIGNAL TRANSMITTERS

Michael K. Russell, Lynworth House, 54 High Street, Prestbury, Cheltenham, England, and Anthony W. Russell, Drachlaw, Turriff, Aberdeenshire, Scotland

Filed Dec. 19, 1988, Ser. No. 286,299

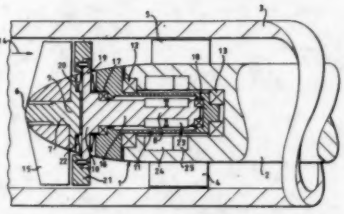
Claims priority, application United Kingdom, Jan. 19, 1988, 8801072

Int. Cl.[5] G01V *1/00*

U.S. Cl. 367—84 **9 Claims**

1. A signal transmitter for transmitting pressure signals within a flowing liquid, the transmitter comprising an impeller

assembly rotatable by the liquid flow about an axis of rotation and an electrical generator having a stator and a rotor arranged to be driven by said impeller assembly, wherein said impeller assembly comprises a main impeller portion and a secondary impeller portion angularly displaceable relative to one another about said axis of rotation of said impeller assembly in response to a change in the load of said generator so as to vary the pressure drop across said rotating impeller assembly, whereby appropriate variation of the load of said generator serves to



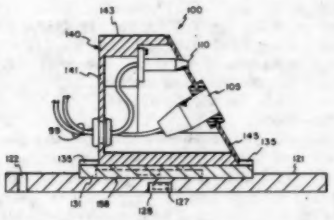
control said impeller assembly in such a manner as to transmit pressure signals within the flowing liquid, said main impeller portion including main blades rotatable about said axis by the liquid flow, and said secondary impeller portion including secondary blades located axially downstream of said main blades and rotatable with said main blades about said axis, the pressure drop across said rotating impeller assembly being dependent on the angular orientation of said secondary blades relative to said main blades about said axis.

4,956,824

POSITION DETERMINATION APPARATUS

Seymour J. Sindeband, Pound Ridge, N.Y., and Robert Butler, Milford, Conn., assignors to Science Accessories Corp., Stratford, Conn.

Filed Sep. 12, 1989, Ser. No. 405,944
Int. Cl.[5] G01S *3/80*
U.S. Cl. 367—129 **23 Claims**



1. Apparatus for determining the position of a moveable element in a three-dimensional workspace near a mounting surface, comprising:

a sound source in said moveable element;

a plurality of at least three housing units adapted to be secured to said mounting surface in spaced relationship to one another;

a sound sensor mounted on each of said units;

a sound source mounted on at least some of said units;

means for adjusting the positions of the sound sensor and the sound source of said at least some of said units;

means responsive to the sound from the sound source of at least one of said units and received at the sound sensor of another of said units, for computing the distance between the sound source of said one of said units and the sound sensor of said another of said units; and

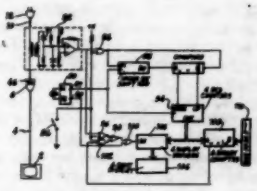
means responsive to the initiation of sound from the sound source of the moveable element and to sound received at the sound sensors of said units, for determining the three-dimensional position of the moveable element.

4,956,825

DEVICE FOR MONITORING THE RATE OF USE OF AN ELECTRICAL APPLIANCE

Charles H. Wilts, 11982 Pomerado Rd.; Michael T. Burke, 14132 Rio Court Rd., both of Poway, Calif. 92062, and David W. Thygeson, 4727 Otoni Ave., San Diego, Calif. 92117

Filed Feb. 5, 1990, Ser. No. 475,164
Int. Cl.[5] G04F *8/00*
U.S. Cl. 368—9 **9 Claims**



1. A use monitor for an electrical appliance for providing a continuous report of appliance use time during a specific moving time interval immediately prior to the report, said monitor comprising:

(a) a sensor for detecting when said appliance is in use;

(b) a register operatively connected to said sensor which records a continuous pulse train indicative of sequential periods of use or non-use of said appliance over said time interval;

(c) counter means for counting the periods of use represented by said pulse train; and,

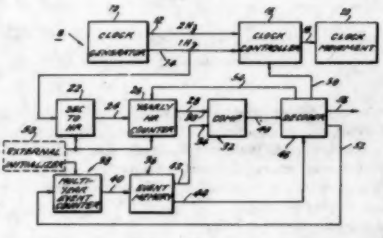
(d) utilization means connected to said counter means for utilizing the results therefrom.

4,956,826

MULTI-YEAR TIME CLOCK HAVING AUTOMATIC DAYLIGHT SAVING TIME COMPENSATOR

Dennis Coyman, Sterling Forest, N.Y., and Richard Gawronski, Naugatuck, Conn., assignors to Master Free Time, Inc., Sterling Forest, N.Y.

Filed Mar. 17, 1989, Ser. No. 325,678
Int. Cl.[5] G04B *19/24, 9/00*
U.S. Cl. 368—28 **20 Claims**



1. A clock circuit for driving a clock movement, the clock circuit comprising:

a frequency generator for providing a timing reference;

time keeping means coupled to the timing reference for developing time information;

a memory containing event-hour information and event-

identifying information, said event-hour information being effective to indicate the time when predetermined events are to occur including daylight saving time schedules for a plurality of years;

comparing means for comparing said time information developed by said time keeping means against said event-hour information obtained from said memory and activating a comparator output when said time information and event-hour information are matched;

a controller, responsive to said comparator output and to said event-identifying information of said memory, for producing clock driving signals for driving a clock movement and for automatically adjusting the clock movement for daylight saving time over a plurality of years;

wherein said frequency generator includes an AC frequency source for developing a primary, AC derived, frequency signal and a secondary, crystal-oscillator-derived, frequency signal and including clock operating means for normally operating said time keeping means from said primary frequency signal and from said secondary frequency signal during AC power outages;

said clock operating means comprising AC power detecting means for detecting said AC power outages and means for producing an AC power status output; and

further comprising a latch coupled between said memory and said controller, delaying means for providing a delayed version of said AC power status output to said memory and to said latch in a manner such that, during power outages, information supplied from said memory is latched in said latch for use during said power outages.

4,956,827

TIMEPIECE

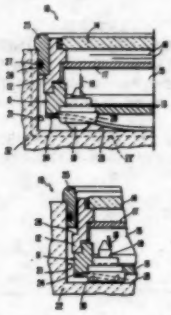
Paolo Spadini, 6, Rue du Gothard, 1225 Chêne-Bourg, Switzerland

Filed Oct. 17, 1988, Ser. No. 258,608

Claims priority, application Switzerland, Oct. 21, 1987, 4114/87

Int. Cl.[5] G04C *17/00*; G04B *1/00*

U.S. Cl. 368—69 **24 Claims**



1. A watch comprising:

a housing;

a quartz-controlled watchwork arranged in said housing;

display means arranged in said housing;

a viewing window provided for said housing and covering said display means;

said housing having a base;

at least one contact arranged internally of said housing and serving for accomplishing control functions of the watch;

said contact being actuatable from the base of the housing;

resilient means acting upon said housing;

receptable means; and

said housing being displaceably mounted against the action of said resilient means in said receptacle means so that upon application of pressure to at least one of the housing or the viewing window said contact is actuated.

4,956,828

WALL CLOCK

Hiroshi Yamada, 1-1, Taihei 4-chome, Sumida-ku, Tokyo, Japan

Filed Jun. 1, 1989, Ser. No. 359,574

Claims priority, application Japan, Jun. 1, 1988, 63-72993[U]

Int. Cl.[5] G04B *19/00, 19/20*

U.S. Cl. 368—76 **20 Claims**

1. A wall clock comprising:

a second dial rotatable in interlocked relation to the rotational driving of a timepiece movement,

a wheel mounted coaxially with said second dial and rotatable in interlocked relation to the rotational driving of said timepiece movement,

an hour dial suspended below said wheel by a belt stretched therearound and rotated in a decelerated manner by means of said belt, and

hands mounted rotatably in respective central portions of said second and hour dials and always pointing upwardly by virtue of weights provided in their respective lower end portions.

4,956,829

TIMEPIECE WITH MODIFIED CLOCK RATE FOR FACILITING ADAPTATION TO NEW TIME STANDARD

Ross E. Mitchell, 4 Alston St., Newtonville, Mass. 02160

Continuation of Ser. No. 325,293, Mar. 17, 1989, Pat. No. 4,901,296. This application Dec. 22, 1989, Ser. No. 455,564

The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.

Int. Cl.[5] G04C *9/00*

U.S. Cl. 368—185 **15 Claims**

1. In a timepiece for continuously advancing an indication of time at a standard rate, an improvement for assisting a user to accommodate to a change, over a given adaptation period, from one time standard originally applicable to said user, to another different time standard, subsequently applicable to said user, comprising:

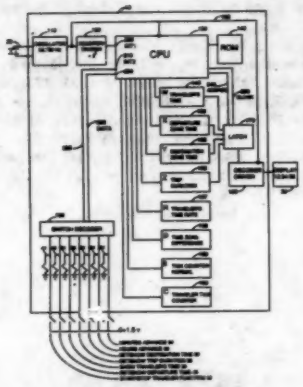
input means for supplying to said timepiece, control data representing at least two of the following: said one time standard originally applicable to said user, said other time standard, subsequently applicable to said user, and said adaptation period;

storage means for storing data representing the time under said original time standard, the time under said other time standard, and said adaptation period;

calculation means, responsive to said data in said storage means, for automatically calculating and supplying, during said adaptation period, output data representing a non-standard rate of advance of time for said timepiece based upon said control data, such that said non-standard rate of advance will correspond to the rate at which time would progress if the time standard experienced by said user gradually changed during said adaptation period

from said original time standard to said other time standard;

display means, responsive to said output data of said calculation means, for indicating time to said user at said non-standard rate during said adaptation period,



such that the time indicated by said timepiece varies gradually during said adaptation period, between the time under said original time standard and the time under said other time standard, and such that said user, by observing said timepiece during said adaptation period, will tend to become gradually psychologically adapted to the time under said other time standard.

4,956,830

WATCH HAVING A CASE FORMED AT LEAST PARTIALLY FROM A HARD MATERIAL

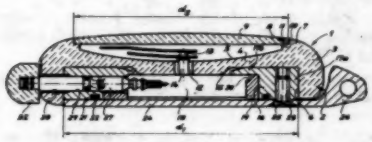
Elmar Mock, and Georges A. Gabus, both of Bienne, Switzerland, assignors to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

Continuation of Ser. No. 916,432, Oct. 7, 1986, abandoned. This application Oct. 26, 1987, Ser. No. 113,423

Claims priority, application Switzerland, Oct. 7, 1985, 04300/85

Int. Cl.[5] G04B *37/00, 29/00*

U.S. Cl. 368—280 **5 Claims**



1. A watch, comprising: a case at least partially formed from a hard material incapable of establishing a reliable fluid tight seal, said case including a continuous and uninterrupted, closed outer caseband (3) formed of said hard material, and an inner caseband (16) housing a watch movement (18) and formed of a rigid but easily machinable metallic material capable of establishing a reliable fluid tight seal, said inner caseband including a first cylindrical bore (29) extending radially therethrough for accommodating a setting stem (27) disposed therein and extending therethrough, said stem being engaged therein in a fluid tight manner by a packing (31) lodged in a peripheral annular groove (30) on the stem so as to be sealingly applied against an inner circumferential wall of said first cylindrical bore, said outer caseband including a second cylindrical bore (28) extending radially therethrough and axially aligned with the first cylindrical bore in the inner caseband, and the stem passing through said second cylindrical bore and having an outer end portion extending to an exterior of the watch, the diameter of the second bore being larger than the diameter of the first bore to enable the insertion of the stem through said bores and into the movement, and the thickness of the inner caseband being greater than the thickness of the movement to establish a sufficient strength of the inner caseband surrounding the first bore to prevent any cross-sectional flattening thereof and an attendant disruption of the stem seal therewith, wherein the outer caseband is fashioned integrally with a central hub portion (4) defining a dial (5), and wherein a cavity (6) bounded by the outer caseband and the central hub portion and intended to house the watch movement includes a recessed annular sump surrounding a thickened stiffening portion (15) provided in a central part of the hub portion, the inner caseband being seated against said sump, and the radial length of said annular sump corresponding approximately to the radial length of the inner caseband.

4,956,831

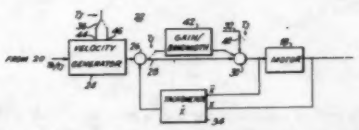
LOW ACOUSTIC NOISE HEAD ACTUATOR

Raymond E. Sarraf, Westminster, and Daniel R. Zaharris, Longmont, both of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed Sep. 14, 1988, Ser. No. 244,059

Int. Cl.[5] G11B *21/10*

U.S. Cl. 369—32 **14 Claims**



1. A disk drive system for recording and/or reproducing data on a disk in a plurality of substantially circular, concentric tracks, said system comprising:

head means for recording and/or reproducing said data in said tracks;

actuator means for positioning said head means at a desired one of said tracks;

a mechanical mounting structure for mounting at least said actuator means;

controller means for generating a selected one of a track access signal and a track jump signal;

closed loop servo control means having predetermined operating parameters for controlling said actuator means to respond to said track access signal to perform a track access operation in which said head means is moved across a relatively large number of said tracks to reach said desired track and to respond to said track jump signal to perform a track jump operation in which said head means is moved across a relatively small number of said tracks to reach said desired track; and

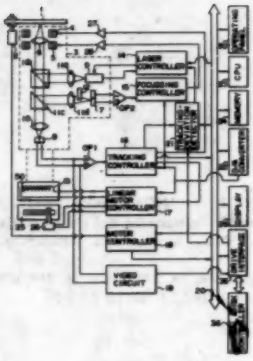
means for modifying the operating parameters of said servo control means in response to said track jump signal.

4,956,832

TRACKING-DEVIATION DETECTOR APPARATUS CAPABLE OF PREVENTING OVERWRITING OF DATA ON AN ADJACENT TRACK

Toshiyuki Miyazaka, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 20, 1988, Ser. No. 246,719
Claims priority, application Japan, Sep. 21, 1987, 62-236775
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—44.11 5 Claims



1. An optical apparatus for use in an optical disk controller having means for recording data via a light beam onto an object and means for reproducing data from the object, the apparatus comprising:

directing means for directing the light beam onto a desired position on the object;

tracking position detecting means for detecting the light beam reflected from the object during recording and for supplying a track-error signal, representing a deviation from the desired position of the light beam on the object, to the directing means;

gain switching means for amplifying the track-error signal with different gains between data recording and data reproduction;

inhibit signal generating means connected to the output of the gain switching means for comparing a level of the amplified track-error signal with a predetermined level and for outputting a write inhibition signal when the level of the amplified track-error signal exceeds the predetermined level; and

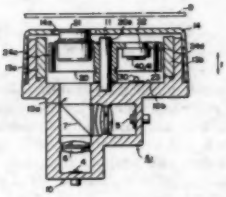
record data control means for receiving the record data, and connected to the inhibit signal generating means for inhibiting the record data from being written in response to the write inhibition signal.

4,956,833

OBJECTIVE DRIVING DEVICE FOR AN OPTICAL DISK APPARATUS

Hiroshi Kokado; Suguru Takishima; Koichiro Nishikawa; Junichi Takeda; Masahiko Sasaki; Isao Okuda; Hiroshi Yamamoto; Masami Ninomiya; Akihiro Tanaka; Hiroshi Motoyashi; Makoto Iwaki, and Wataru Kubo, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 32,001, Mar. 30, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 456,068
Claims priority, application Japan, Mar. 31, 1986, 61-73613; Mar. 31, 1986, 61-73614; Apr. 18, 1986, 61-89518; Apr. 21, 1986, 61-91871; Apr. 26, 1986, 61-95901; Apr. 26, 1986, 61-95902; Apr. 28, 1986, 61-100472; Apr. 30, 1986, 61-99732; May 7, 1986, 61-104452; May 14, 1986, 61-110113; May 16, 1986, 61-112079; Jun. 18, 1986, 61-141569; Jun. 26, 1986, 61-150220; Oct. 15, 1986, 61-157801[U]
Int. Cl.[5] G11B 7/09
U.S. Cl. 369—46 22 Claims



1. An optical pickup for a planar optical disk having a plurality of tracks, said optical pickup comprising:

(a) an optical pickup body provided with a laser for producing laser light;

(b) a movable portion mounted on said optical pickup body for movement relative thereto in a tracking direction essentially perpendicular to a track and for rotation about an axis perpendicular to the plane of the disk;

(c) an optical system, including an objective mounted on said movable portion, for focusing laser light into a spot of said disk;

(d) a photodetector cooperable with said optical system for receiving laser light reflected from said disk and producing tracking error signals;

(e) a position sensor for producing position signals that establish the position of said movable portion relative to said body;

(f) a servo tracking circuit responsive to said position signals and said tracking error signals for producing a driving signal;

(g) actuator means for moving said movable portion on said optical pickup to thereby displace said objective in a tracking direction in response to said driving signal;

(h) said position sensor including a light source, and light receiving means for receiving light from said source, said position sensor being constructed and arranged so that said light receiving means produces said position signals; and

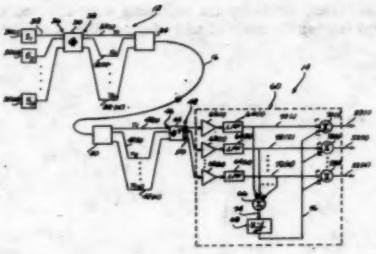
(i) said light receiving means including at least two photosensitive receivers displaced from each other in the tracking direction, said light source being different from said laser, said movable portion including a planar plate having a surface parallel to the plane of said disk, said receivers being mounted on said plate, and said light source being mounted on said optical pickup body.

4,956,834

COHERENCE MULTIPLEXED OPTICAL SIGNAL TRANSMISSION SYSTEM AND METHOD

Jeffrey O. Coleman, Medina, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 12, 1989, Ser. No. 296,445
Int. Cl.[5] H04B 9/00
U.S. Cl. 370—1 12 Claims



7. A coherence multiplexed optical signal transmission method for transmitting a plurality of N input signals over a common optical bus, the method comprising:

combining the input signals to produce N intermediate transmitter signals such that the coupling between input signals and intermediate transmitter signals is represented by a unitary coupling matrix;

time delaying the intermediate transmitter signals using a set of first time delays, such that there is a delay difference between each pair of first time delays, and such that the difference between each pair of delay differences is greater than the coherence length of each input signal;

combining the transmitter intermediate signals to produce a composite signal;

coupling the composite signal into the common optical bus;

receiving the composite input signal from the common optical bus and dividing the composite input signal to produce N intermediate receiver signals;

time delaying the intermediate receiver signals using a second set of second time delays substantially equal to said first time delays; and

combining the intermediate receiver signals to produce N output signals, such that the coupling between the intermediate receiver signals and the output signals is represented by a unitary coupling matrix.

4,956,835

METHOD AND APPARATUS FOR SELF-RESTORING AND SELF-PROVISIONING COMMUNICATION NETWORKS

Wayne D. Grover, Edmonton, Canada, assignor to Alberta Telecommunications Research Centre, Edmonton, Canada

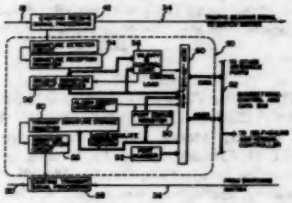
Filed Oct. 19, 1988, Ser. No. 255,748
Claims priority, application Canada, Nov. 6, 1987, 551311
Int. Cl.[5] H04J 1/16, 3/14
U.S. Cl. 370—16 76 Claims

1. A method of restoring communications between a pair of nodes in a network having an arbitrary number of nodes and an arbitrary number of spans interconnecting said nodes, each said span having working circuits between nodes designated for transmitting actual communications traffic and spare circuits between nodes capable of, but not designated for, transmitting actual communications traffic, said method comprising the steps of:

(a) establishing one or more independent communication paths between said pair of nodes through a series of spare circuits of spans interconnecting said pair of nodes and other interconnected nodes in said network, including the steps of:

i. repeatedly transmitting restoration signals along logical spans of spare circuits departing said one node;

ii. repeatedly retransmitting said restoration signals from said other interconnected nodes along logical spans of spare circuits departing said interconnected nodes; and



iii. upon receipt of a restoration signal by said other node, transmitting a complement restoration signal from said other node along a path consisting of the same spare circuits along which said restoration signal was communicated to said other node; and

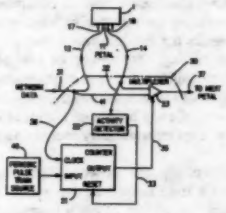
(b) redirecting communications traffic intended for one or more failed spans interconnecting said pair of nodes through one or more of said paths.

4,956,836

AUTOMATIC BYPASS SYSTEM FOR RING TYPE LOCAL AREA NETWORK

Darrell L. Boatwright, Cedar Rapids, Iowa, assignor to PAR Microsystems Corp., New Hartford, N.Y.

Filed Mar. 28, 1988, Ser. No. 173,824
Int. Cl.[5] H04J 1/16
U.S. Cl. 370—16.1 8 Claims



1. In a local area ring network wherein a plurality of signal transmitting and receiving nodes, each including a transmission link switch operable in either a transmitting or a blocking condition, each of said nodes being connected to the next in a continuous series by a signal-conducting path having first portions including an individual node and input and output lines connected thereto, and second portions through which each of said first portion output lines is connected to the next first portion input line, an automatically operable bypass system for isolating one of said first portions from the remainder of said signal-conducting path in response to a failure within said one first portion while maintaining the continuous series connection of all parts of said network other than said one first portion, said bypass system comprising:

(a) an activity detector (22) having an input connected (via 32) to said one node output line (14), and adapted to generate an output when signals are present on said one node output line;

(b) a signal-conducting bypass line (41) for conducting sig-

nals from the node preceding to the node succeeding said one node without passing through said one first portion;

(c) first means (23) operable in response to a control input to enable signals from either said bypass line or said one node output line to be transmitted to the input line (37) of said succeeding node; and

(d) second means (21) connected to receive and detect inputs from both said activity detector output (via 33) and said one node input line (via 36), and operable to supply (via 35) said control input to said first means in response to absence of an input from said activity detector output when inputs from said one node input line are detected.

4,956,837

APPARATUS FOR AVOIDING SPECTRUM SPREADING WHEN SWITCHING A TRANSMITTER ON AND OFF

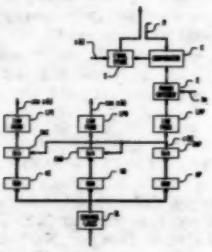
Per C. M. Vollmer, Handen, Sweden, assignor to Telefonaktiebolaget L M. Ericsson, Stockholm, Sweden

Filed Sep. 7, 1988, Ser. No. 241,305

Claims priority, application Sweden, Sep. 8, 1987, 8703483

Int. Cl.[5] H04B 7/005

U.S. Cl. 370—20 **5 Claims**



1. Apparatus for avoiding spectrum spreading caused by switching on and off a transmitter in a station included in a time multiplexed radio transmission system comprising:

means for generating two mutually 90-degree phase shifted baseband signals for modulating a carrier wave;

means for controlling the power of the baseband signals during a given time period in the beginning of each transmission time slot, which is assigned to the station, such that the power of each baseband signal at least practically follows an at least substantially increasing reference level; and

means for controlling the power of the baseband signals during a given time period at the end of each such time slot such that the power of each baseband signal at least practically follows an at least substantially decreasing reference level.

4,956,838

ECHO CANCELLING DEVICE WITH FREQUENCY SUB-BAND FILTERING

André Gilloire, Lannion, France, and Martin Vetterli, New York, N.Y., assignors to ETAT Francais représenté par le Ministre des postes, Télécommunications et de l'Espace (Centre National d'Etudes des Télécommunications), Issy les Moulineaux, France

Filed Mar. 14, 1989, Ser. No. 322,947

Claims priority, application France, Mar. 15, 1988, 88 03341

Int. Cl.[5] H04B 3/23

U.S. Cl. 370—32.1 **9 Claims**

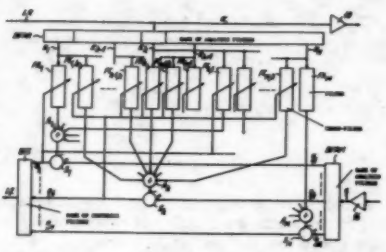
1. An echo cancelling device for use between a line receiving an incoming echo-affected signal and a line transmitting an outgoing signal, for cancelling out echo, comprising a plurality of processing channels connected in parallel relation and assigned to successive mutually adjacent sub-bands of the spectral band of the outgoing signal, each of said channels comprising;

a subtractor circuit having an additive input and a subtractive input for delivering an output signal at an output;

an adaptive filter having an input and an output connected to the subtractive input of said subtractor circuit;

a first analysis band-pass filter receiving the incoming echo-affected signal, the output of said first band-pass filter being connected to the additive input of said subtractor circuit;

a second analysis band-pass filter, identical to the first band-pass filter, receiving the incoming echo-affected signal and feeding the input of said adaptive filter for delivering



an estimated echo value in the sub-band of the corresponding channel to the subtractive input of the subtractor; and

a synthesis filter connected to the output of said subtractor circuit for rebuilding the full band of said incoming echo-affected signal and whose output feeds the line transmitting the output signal,

means for extracting through filtering for a particular sub-band, the aliasing component originating from another sub-band and for eliminating the aliasing component by adding it to the signal originating from the filter analyzing the incoming echo-affected signal corresponding to said particular sub-band.

4,956,839

ATM SWITCHING SYSTEM

Yutaka Torii; Makoto Mori; Shinobu Gohara, all of Yokohama; Kenichi Ohtsuki, Kanagawa, and Yoshito Sakurai, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 20, 1989, Ser. No. 382,419

Claims priority, application Japan, Jul. 22, 1988, 63-181885; Sep. 28, 1988, 63-241098

Int. Cl.[5] H04Q 11/04

U.S. Cl. 370—60 **18 Claims**

1. An ATM (Asynchronous Transfer Mode) switching system, comprising:

a plurality of ATM line terminating apparatus each provided for each of a plurality of lines, respectively, each ATM line terminating apparatus including:

(a) line terminating means for accommodating a transmission line to perform (i) extraction of a clock signal and detection of a frame from an input signal coming in the form of cells, each of a fixed length, and (ii) phase synchronization on a bit basis,

(b) cell phase synchronizing means connected to the output of said line terminating means for detecting the phase of the cells inputted with phases differing from one to another line and for synchronizing said cells of said lines with respect to the phase thereof,

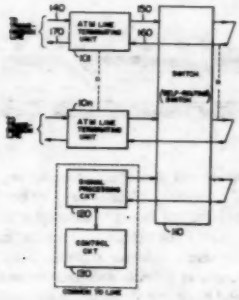
(c) header detecting means connected to the output of said cell phase synchronizing means for reading a header contained as a part of the cell,

(d) storage means for storing header information read out by said header detecting means,

(e) flow monitor means for monitoring flows of cells on said lines on the basis of the header information stored in said storage means, and

(f) header conversion means connected to the output of said header detection means, the output of said storage means and the output of said flow monitoring means for changing the header of the cell on the basis of the outputs of said header detection means, said storage means and said flow monitoring means;

a signal processing circuit provided in common to said lines for processing a call control signal on a line basis;



a control circuit provided in common to said lines and interconnected with said signal processing circuit for controlling the processing of calls on a line basis in accordance with call control information supplied from said signal processing circuit; and

a self-routing type switch connected to each of said ATM line terminating apparatus for switching the cell coming from a given one of said ATM line terminating apparatus to another ATM line terminating apparatus in accordance with the header information contained in said cells.

4,956,840

MULTISTAGE DIGITAL SWITCHING NETWORK

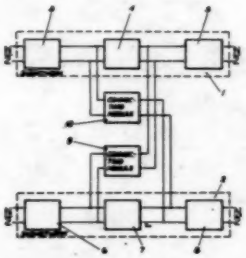
Andrzej Jajszczyk, and Wojciech Kabaciński, both of Poznan, Poland, assignors to Politechnika Poznanska, Poznan, Poland

Continuation of Ser. No. 891,211, Jul. 28, 1986, abandoned. This application Dec. 1, 1988, Ser. No. 279,314

Claims priority, application Poland, Aug. 12, 1985, 254969; Mar. 25, 1986, 258628

Int. Cl.[5] H04J 3/02

U.S. Cl. 370—65.5 **2 Claims**



1. A multistage digital switching network composed of two, first and second, identical subnetworks each of said subnetworks having a capacity of N/2×N/2 PCM links, characterized in that each of said subnetworks consists of three, first, middle and last modules connected in series, wherein each of said modules constitutes either a single switching element or a single-stage switching network or a multi-stage switching network, inputs of said middle module of said first of said subnetworks being connected through an additional connecting module with outputs of said middle module of said second of said subnetworks; and inputs of said middle module of said second of said subnetworks being connected through another additional connecting module with outputs of said middle module of said first of said subnetworks; said additional connecting modules being identical to said middle modules of said subnetworks.

4,956,841

METHOD AND DEVICE FOR SWITCHING A PACKET OF DATA

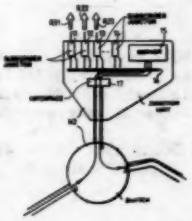
André Judelstein, Remy-Les Chevreuses, and Laurent Fevrier, Paris, both of France, assignors to LMT Radioprofessionnelle, Boulogne Billancourt, France

Filed Jan. 4, 1989, Ser. No. 293,418

Claims priority, application France, Jan. 8, 1988, 88 00139

Int. Cl.[5] H04J 3/24

U.S. Cl. 370—94.1 **3 Claims**



1. A method for switching of a data packet along a main trunk route of a communications network, comprising switch nodes, wherein said method uses an arrowed packet comprising ordinary node-to-node guiding arrows and consists in effecting, from certain nodes of the main trunk route, a local transmission of data from a subscriber towards addresses and, for this purpose, in placing, in the packet, after each of the ordinary arrows which make the packet reach a node where a local transmission of data towards the addresses has to be made, an other arrow and pieces of information, said other arrow designating a transmission server proper to the node to which the packet was made to reach by the ordinary arrow preceding said other arrow, and said pieces of information being of three types: a designation of a zone of the server containing a list of addresses, data to be sent to the addresses and a protocol for the use of this data.

4,956,842

DIAGNOSTIC SYSTEM FOR A WATCHDOG TIMER

Waleed Said, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 16, 1988, Ser. No. 272,059

Int. Cl.[5] G06F 11/00

U.S. Cl. 371—62 **24 Claims**

3. A testing system for a watchdog timer monitoring a programmed processor and associated with a system which is controlled by a control program executed by the programmed processor and which is monitored by a supervisory system with the watchdog timer generating an interruption signal which interrupts execution of the control program when the watchdog timer does not generate a reset comprising:

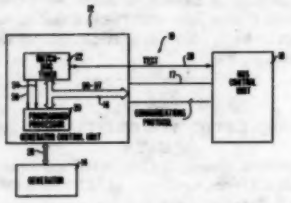
means contained in the supervisory system coupled to the watchdog timer for initiating testing of the watchdog timer; and

means contained in the watchdog timer for disabling the

generation of the interruption signal during testing of the watchdog timer;

wherein the watchdog timer further comprises;

means for shutting down the system which is controlled by the control program when the control program does not



resume normal operation in response to an interruption signal; and wherein

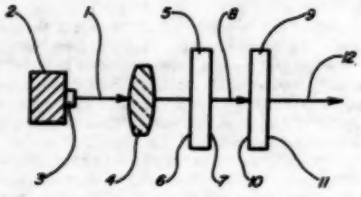
the watchdog timer has means for disabling the means for shutting down the system which is controlled by the control program during testing of the watchdog timer.

4,956,843

SIMULTANEOUS GENERATION OF LASER RADIATION AT TWO DIFFERENT FREQUENCIES

Pedram Akhavan-Leilabady, Woodridge, and Douglas W. Anthon, Wheaton, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 10, 1989, Ser. No. 418,856
Int. Cl.[5] H01S 3/10
U.S. Cl. 372—23 **28 Claims**



19. An apparatus for simultaneously generating laser radiation of two different frequencies which comprises:

(a) optical pumping means for generating optical pumping radiation, wherein said optical pumping means comprises a semiconductor light source;

(b) a first optical cavity for resonating laser radiation of a first frequency;

(c) first optical gain means for receiving said optical pumping radiation which is disposed within said first optical cavity, wherein said first optical gain means is effective to transmit a portion of said optical pumping radiation and to absorb a portion of said optical pumping radiation, wherein said first optical gain means is effective to generate laser radiation of said first frequency in response to the absorbed portion of said optical pumping radiation, and wherein said first optical gain means consists of a solid lasant material;

(d) a second optical cavity for resonating laser radiation of a second frequency; and

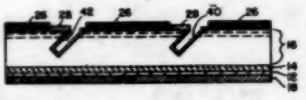
(e) second optical gain means for receiving said transmitted portion of the optical pumping radiation which is disposed within said second optical cavity, wherein said second optical gain means is effective to generate laser radiation of said second frequency in response to the transmitted portion of said optical pumping radiation, and wherein said second optical gain means consists of a solid lasant material.

4,956,844

TWO-DIMENSIONAL SURFACE-EMITTING LASER ARRAY

William D. Goodhue, Chelmsford; Kurt Rauschenbach, Marlboro, and Christine A. Wang, Bedford, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 17, 1989, Ser. No. 325,292
Int. Cl.[5] H01S 3/00
U.S. Cl. 372—44 **18 Claims**



1. A two-dimensional semiconductor surface-emitting laser array formed of a plurality of laser cavities each comprising:

(a) an active layer of lasing semiconductor material for emitting rays of light extending longitudinally in a plane between two semiconductor layers;

(b) a first intra-cavity reflective surface formed at one end of said layer and bisecting the plane of said active layer at an angle which internally reflects said light rays from said layer in a first direction approximately normal to said plane;

(c) a second intra-cavity reflective surface formed at an opposite end of said layer and bisecting said plane at about the same angle as in (b) to internally reflect light rays from said layer in a second direction opposite said first direction and approximately normal to said plane;

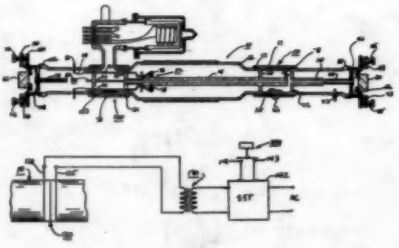
(d) a light reflective mirror formed in the path of said second direction.

4,956,845

METAL VAPOR LASER HAVING MEANS TO EXTEND LIFETIME OF TUBE

Manfred R. Otto, 1016 Corinthian Way, Pomona, Calif. 91768; Edwin A. Reed, 1092 W. 17th St., Upland, Calif. 91786, and William F. Hug, 382 E. California, #106, Pasadena, Calif. 91106

Filed Aug. 6, 1987, Ser. No. 82,304
Int. Cl.[5] H01S 3/22
U.S. Cl. 372—56 **1 Claim**



1. A gas laser comprising:

a gas envelope;

an active gaseous medium disposed within said envelope, said medium comprising a mixture of first and second components, said first component having a lower ionization potential than the ionization potential of said second

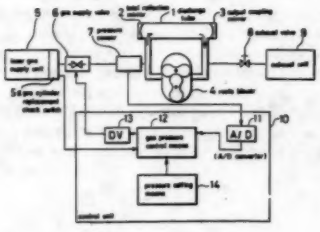
component in said mixture, said first component comprising a metal vapor;
cathode means disposed within said envelope;
anode means disposed within said envelope;
a capillary member positioned within said envelope between said cathode means and said anode means;
means for applying a voltage between said cathode means and said anode means for creating a discharge in said active gaseous medium which provides stimulated emission gases for generating laser radiation;
means adjacent said anode means for supplying said first component of said gas mixture which flows in the direction of said cathode means through said capillary means during the generation of said laser radiation;
means positioned adjacent the end of said capillary member closest to said cathode means for melting the metal condensate which builds up near said capillary member and which inhibits transmission of the laser beam internal to said envelope during operation of said gas laser;
circuit means for energizing said melting means, said circuit means including a switch for enabling a user to periodically energize said melting means and melt said condensate; and
timing means connected to said switch means for enabling said melting means to be energized for a pre-determined time interval.

4,956,846

GAS LASER DEVICE

Nobuaki Ichisa, Yamanashi, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00672, § 371 Date Feb. 22, 1989, § 102(e) Date Feb. 22, 1989, PCT Pub. No. WO89/00352, PCT Pub. Date Jan. 12, 1989
PCT Filed Jul. 6, 1988, Ser. No. 320,307
Claims priority, application Japan, Jul. 7, 1987, 62-169295
Int. Cl.[5] H01S *3/22*
U.S. Cl. 372—58 **4 Claims**



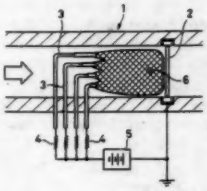
1. A gas laser device for effecting a laser oscillation while circulating a laser gas, comprising:
a laser gas supply unit;
a gas supply valve provided at an outlet of said laser gas supply unit;
a discharge tube;
an exhaust unit for exhausting gas in said discharge tube;
a sequence start means for starting an exhaust sequence, said sequence start means comprising a gas cylinder replacement check switch; and
an exhaust sequence means for exhausting air in said discharge tube after closing said gas supply valve, introducing a laser gas into the discharge tube by opening said gas supply valve after the discharge tube has been brought to a vacuum state and effecting a vacuum exhausting of the discharge tube after closing said gas supply valve.

4,956,847

ELECTRODES FOR A GAS LASER APPARATUS AND METHOD OF MAKING THE SAME

Kiyohisa Terai, and Koichi Nishida, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 25, 1989, Ser. No. 356,421
Claims priority, application Japan, Jun. 10, 1988, 63-143944
Int. Cl.[5] H01S *3/077*
U.S. Cl. 372—87 **8 Claims**



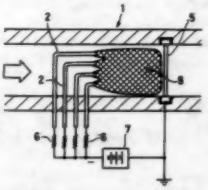
1. A gas laser apparatus comprising:
an anode and cathode disposed in an atmosphere of a gas mixture as a laser medium, said cathode having a titanium base;
means for applying DC voltage across said anode and cathode so that an electric discharge is initiated, thereby exciting said gas mixture;
a lightening portion on said cathode having a titanium oxide layer on a surface thereof, said lightening portion corresponding to a portion covered with a glow during said electric discharge.

4,956,848

ELECTRODES FOR GAS APPARATUS AND METHOD OF MAKING THE SAME

Kiyohisa Terai, and Koichi Nishida, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 25, 1989, Ser. No. 356,420
Claims priority, application Japan, Jun. 15, 1988, 63-147650
Int. Cl.[5] H01S *3/097*
U.S. Cl. 372—87 **5 Claims**



1. A gas laser apparatus comprising:
a cathode;
an anode with a chromium coating on a surface thereof;
means for enclosing said cathode and said anode in an atmosphere of a gas mixture as a laser medium; and
means for causing electric discharge between said cathode and said anode, thereby exciting said gas mixture.

4,956,849

PROCESS AND APPARATUS FOR GRAPHITIZING CARBON BODIES

Claude Holuigue, Le Fayet, France; Heinrich Panholzer, Linz, Austria; Karl-Wilhelm Maier, Flirth, Fed. Rep. of Germany, and Wolfgang Trimmel, Leoben, Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Aug. 1, 1989, Ser. No. 388,256
Claims priority, application Austria, Aug. 4, 1988, 1966/88
Int. Cl.[5] H05B *3/00*
U.S. Cl. 373—120 **9 Claims**

4. An apparatus for graphitizing carbon bodies arranged in a horizontally extending train consisting of a series of carbon

bodies of equal length in end-to-end alignment, which comprises

(a) a graphitizing furnace comprising

(1) a housing having entrance and exit ends spaced apart along a horizontal axis,

(b) an inert gas contained in said housing,

(c) an intermittently operable conveyor for feeding said train through the housing in a conveying direction from said entrance end to said exit end in consecutive feeding steps of a length corresponding to the length of the carbon bodies, the train having respective terminal carbon bodies at the entrance and exit ends and the conveyor comprising

(1) two axially reciprocable gripping heads arranged respectively axially adjacent the entrance and exit ends, the gripping heads being operable to grip the train at respective ends thereof axially to exert thereon an axial

compressive stress sufficient to render the train self-supporting in said housing, consecutive reciprocation of the gripping heads in the conveying direction causing the consecutive feeding steps,

(d) auxiliary gripping means arranged respectively at the entrance and exit ends and operable for respectively radially gripping the terminal carbon body adjacent the gripping head at the exit end at the start of each consecutive feeding step and the terminal carbon body ajacent the gripping head at the entrance end at the end of each consecutive feeding step, and

(e) electric terminal means operable to cause electric current to flow through said train in said housing until the train is heated to a graphitizing temperature at least along a part of the length of said train.

4,956,850

DIGITAL ELECTRONIC SYSTEM

Keith Balmer, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

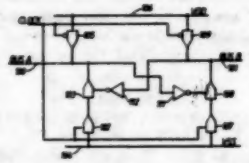
Filed Dec. 1, 1988, Ser. No. 278,710

Claims priority, application United Kingdom, Dec. 1, 1987, 8728065

Int. Cl.[5] H04L *25/20, 25/52*

U.S. Cl. 375—3 **8 Claims**

1. A digital electronic system having a plurality of modules interconnected by a bus wherein the bus is divided into a plurality of sections, each of said sections connected to a module and buffer such that said buffer is connected serially between two of said sections, and wherein said buffer is provided for transmitting signals on a first section of the bus to a second



section of the bus in order that the loading of said second section of the bus is not imposed on said module connected to said first section of the bus, and further comprising receiving means for receiving a clock signal, wherein said buffer transmits said signal responsive to a clock signal received by said receiving means.

4,956,851

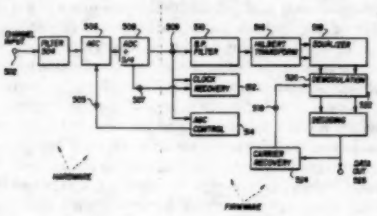
MODEM WITH REMOTE SPEED-CHANGE CAPABILITY

Joel A. Wolensky, Silver Spring, and William A. Dunn, Beltsville, both of Md., assignors to Case Communications Inc., Columbia, Md.

Filed May 25, 1988, Ser. No. 198,504

Int. Cl.[5] H04B *1/38*

U.S. Cl. 375—8 **7 Claims**



1. A modem receiver, comprising:

means for being trained by, selectably, either a first training sequence, corresponding to a first protocol at a first signalling rate, or a second training sequence, corresponding to a second protocol at a second signalling rate different from said first signalling rate, wherein said first and second training sequences have respective first and second initial portions with respectively different spectra;

a filter connected to repeatedly

test an incoming signal for the presence of a first frequency which is strongly present in said first initial portion and not in said second initial portion, and

test the incoming signal for the presence of a second frequency which is strongly present in said second initial portion and not in said first initial portion;

decision logic connected to selectively activate said means for being trained, to be trained in accordance with said first protocol, if said filter detects a much higher energy level at said first frequency than at said second frequency, or in accordance with said second protocol, if said filter detects a much higher energy level at said second frequency than at said first frequency; and

wherein said initial portion of said first training sequence has a spectrum with high energy density at band-edge frequencies of said first protocol, and said initial portion of said second training sequence has a spectrum with low energy density at band-edge frequencies of said first protocol.

4,956,852

METHOD FOR REMOTE CONFIGURATION OF A MODEM

Dean Y. Hodge, Madison, Ala., assignor to Universal Data Systems, Inc., Huntsville, Ala.

Filed Aug. 30, 1988, Ser. No. 238,800

Int. Cl.[5] H04Q *9/00*

U.S. Cl. 375—8 **14 Claims**

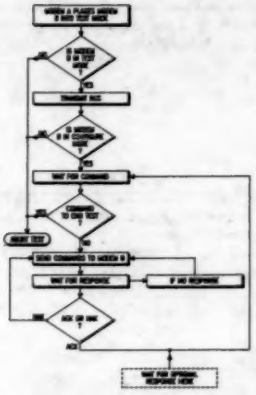
1. In a communications system having at least a first and a second modem, a method selectively operable by a user for remotely configuring a modem without using a tertiary channel, said method comprising the steps of:

using said first modem to place said second modem in a test mode via a main channel;

transmitting from said first modem via said main channel, following said test mode placement step, a predetermined

coded signal identifiable by said second modem primarily causing said second modem to change from said test mode to a reconfiguration mode;

configuring said second modem following identification of



said coded signal via at least one signal from said first modem; and

using said first modem to move said second modem out of said reconfigure mode.

4,956,853

METHOD OF SERVO-CONTROLLING THE INSTANT OF REGENERATION IN A DIGITAL TRANSMISSION IN WHICH A CARRIER IS MODULATED ALONG TWO AXES IN QUADRATURE, AND APPARATUS FOR IMPLEMENTING THE METHOD

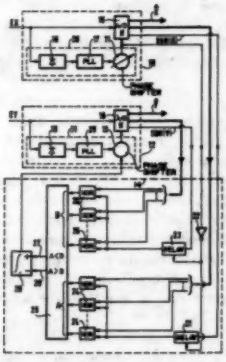
Olivier De Luca, Suresnes, France, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Feb. 17, 1989, Ser. No. 312,643

Claims priority, application France, Feb. 18, 1988, 88 01923

Int. Cl.[5] H03D *3/24*

U.S. Cl. 375—102 **8 Claims**



3. Apparatus for receiving a digital transmission comprising two carrier components in quadrature relationship, each independently modulated with respective digital information, the apparatus comprising:

a first regenerator circuit including a first clock recovery circuit whose output phase is manually adjustable, for producing information signals and clock phase offset signals relating to the first carrier component;

a second regenerator circuit including a second clock recovery circuit for producing information signals and clock phase offset signals relating to the second carrier component; and

a comparator circuit for comparing the clock phase offset signals from these two regenerator circuits and

means for automatically controlling the output phase of only the second clock recovery circuit such that its phase offset signals tend to approximate those from the first regenerator circuit.

4,956,854

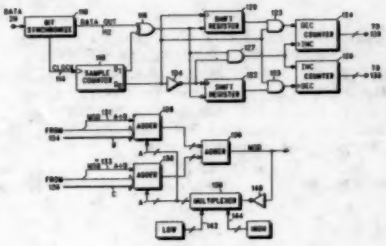
DIGITAL PATTERN DECODER

Dale F. Bengtson, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 9, 1988, Ser. No. 242,450

Int. Cl.[5] H04L *7/08*

U.S. Cl. 375—111 **3 Claims**



1. A decoder for decoding a predetermined binary pattern from within a data stream, wherein the pattern includes a repetitious series of binary digits and each series of digits is composed of 2N bits, N being a positive integer greater than 1, and the first N bits is the complement of the second N bits of the series, comprising:

first means for bit synchronizing to the bits of the pattern;

second means, responsive to the first means, for generating a clock signal;

third means for analyzing the data stream in an alternating manner so as to generate N paths, wherein each path receives every Nth respective bit of the data stream;

fourth means, responsive to the clock signal and to each respective data path, for comparing the clock signal to each respective data path; and

means, responsive to said fourth means, for determining if the pattern is encompassed within the data stream.

4,956,855

X-RAY LINE DETECTOR DEVICE AND X-RAY ANALYSIS APPARATUS COMPRISING SUCH A DEVICE

Geert Brouwer, Waalre, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,952

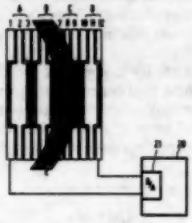
Claims priority, application Netherlands, Oct. 16, 1987, 8702474

Int. Cl.[5] G01N *23/223*

U.S. Cl. 378—45 **4 Claims**

1. An X-ray line detector device, comprising an array of parallel arranged solid state detector elements, characterized in that each of the solid state detector elements has the same width and is identically segmented into a plurality of neighbor-

ing separate segments, comprising a central segment and an adjacent segment wherein a central portion of said central segment having a width which approximates that of the solid state detector element, said central segment further comprising end portions having a substantially smaller width than the



central portion of said central segment, and wherein said adjacent segment comprises a central portion and end portions, wherein the width of the end portions of said adjacent segment is substantially larger than the width of the central portion of said adjacent segment.

4,956,856

ARRANGEMENT FOR EXAMINING A BODY COMPRISING A RADIATION SOURCE

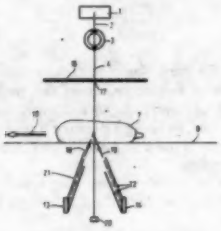
Geoffrey Harding, Hülsenbek, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,955

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733599; Jun. 10, 1988, 3819739

Int. Cl.[5] G01N *23/201*

U.S. Cl. 378—88 **12 Claims**



1. A radiation arrangement for examining a body comprising:

(a) radiation source means for producing a primary radiation beam having a pencil beam cross-section,

(b) displacement means for producing a relative displacement between a body to be examined and said primary radiation beam,

(c) detection means for detecting radiation elastically scattered at small scattering angles by said body from said primary radiation beam, wherein said small scattering angles are approximately equal to the sine of said scattering angle, and

(d) diaphragm means constituting a plurality of lamella disposed between said body and said detection means for directing scattered radiation at said small scattering angles from different sections of said primary radiation beam in said body to different measuring strips on a measuring surface of said detection means, said detection means having a lateral resolution in a longitudinal direction of said measuring strips, such that said detection means is position sensitive along each of said plurality of lamella,

wherein said detection means includes a plurality of parallel detectors, said plurality of detectors being disposed adjacent an area of said primary radiation beam, and said detectors detecting each time said scattered radiation passing through adjacent lamellas, said small scattering angle being determined by the striking point of said scattered radiation on said detectors, and wherein reciprocating diaphragm means are disposed between said radiation source means and said body for producing said primary radiation beam in a reciprocating movement in a plane parallel to said detection means.

4,956,857

X-RAY FLUOROSCOPIC APPARATUS

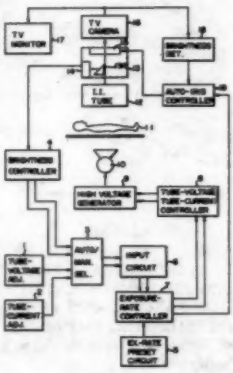
Kaoru Kurosaki, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 12, 1988, Ser. No. 217,982

Claims priority, application Japan, Jul. 16, 1987, 62-177406

Int. Cl.[5] H05G *1/34*

U.S. Cl. 378—110 **8 Claims**



1. An X-ray fluoroscopic apparatus comprising:

fluoroscope means for obtaining a fluoroscopic image of an object to be examined by detecting X-rays radiated by an X-ray tube and transmitted through the object;

camera means, having an iris closed to a predetermined setting, for receiving through the iris a fluoroscopic image of the object obtained from X-rays transmitted through the object;

input means for inputting an entrance exposure rate of the X-rays radiated by said X-ray tube; and

exposure rate setting means, connected to said fluoroscope means and said input means, for comparing the entrance exposure rate with a predetermined reference exposure rate, and for applying in said X-ray tube a tube current and a tube voltage which are determined in accordance with the entrance exposure rate input by said input means;

said exposure rate setting means having means for adjusting said iris to a predetermined setting when the input entrance exposure rate is less than the reference exposure rate; and

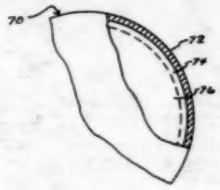
said exposure rate setting means having means for opening said iris such that the brightness of an image received by said camera means becomes a desired value when the entrance exposure rate input by said input means is greater than the reference rate.

4,956,858

METHOD OF PRODUCING LUBRICATED BEARINGS

Kamleshwar Upadhya, Glendale, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Feb. 21, 1989, Ser. No. 313,182
Int. Cl.[5] H01J 35/10, 35/26
U.S. Cl. 378—133 3 Claims



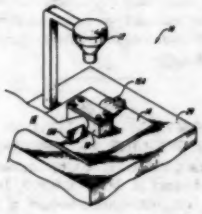
1. An x-ray tube comprising:
an evacuated envelope;
an anode and cathode contained within said envelope;
a bearing means of supporting said anode, said bearing means including a bearing substrate material with an implantation layer of solid lubricant implanted in the substrate material to a depth of at least 2 atomic diameters beneath the surface of said substrate said implantation layer covered by an ion plated layer plated by plasma assisted ion plating with a layer of solid lubricant.

4,956,859

SOURCE FILTER FOR RADIOGRAPHIC IMAGING

Richard C. Lanza, Brookline, and Joseph R. Votano, Tewksbury, both of Mass., assignors to Expert Image Systems, Inc., Somerville, Mass.

Filed Mar. 10, 1989, Ser. No. 321,989
Int. Cl.[5] G21K 3/00
U.S. Cl. 378—157 22 Claims



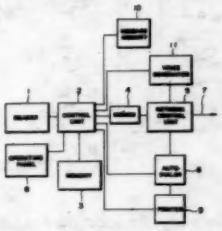
1. An apparatus for analyzing biological structures by photon absorptiometry, the apparatus comprising:
a radiation source emitting photons with a range of energy levels, said radiation source including at least one source filter element which operates to reduce the emission of high energy photons; and
a detector means for determining the spatial intensity of radiation from the radiation source, said detector means having a selective characteristic response which is relatively insensitive to low energy photons, the detector means cooperating with said source filter to measure the intensity of photons within a narrowed band of energy levels.

4,956,860

SYSTEM FOR REPORTING STATUS DATA IN A FACSIMILE NETWORK

Tsuneo Murata, Mitaka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 18, 1987, Ser. No. 134,864
Claims priority, application Japan, Dec. 19, 1986, 61-194395[U]
Int. Cl.[5] H04M 11/00; H04N 1/21
U.S. Cl. 379—100 13 Claims



1. A facsimile apparatus having a multi-address calling function of sequentially transmitting identical picture data to a plurality of destination parties, wherein an abnormality can occur during the multi-address calling procedure, said apparatus comprising:
instruction issuing means for issuing an instruction to transmit a communication result after completion of communication;
a memory means for registering a telephone number of a telephone set to which said communication result is to be transmitted, data concerning a destination office with which line interconnection could not be made, data on a destination office in which facsimile communication has abnormally terminated, and a content of the abnormality during the multi-address calling operation;
means for controllably performing line interconnection with the telephone set having the telephone number registered in said memory means when there is an instruction issued from said instruction issuing means after the communication is completed;
message information generating means for judging whether or not the communication has performed normally based on the content of said memory means after completion of the multi-address calling operation, and for generating message information indicative of the destination office with which line interconnection could not be made, the destination office of which facsimile communication has abnormally terminated and the content of the abnormality, the message information corresponding to a result of the judgement;
journal outputting means for outputting a journal on which the generated message information is printed; and
message transmitting means for converting the generated message information into a voice corresponding to the generated message information and then transmitting by said line interconnection control means the voice to the telephone set connected with the line.

4,956,861

METHOD AND APPARATUS FOR ADDRESSEE LOCATION

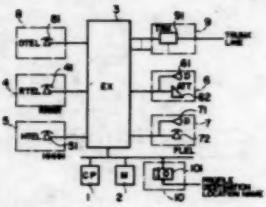
Tetsuo Kondo, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,518
Claims priority, application Japan, Mar. 29, 1988, 63-73391
Int. Cl.[5] H04M 3/54
U.S. Cl. 379—142 24 Claims

1. A method of locating an addressee for a call on a private

telephone branch exchange wherein an extension telephone of the private branch exchange is allotted to the addressee, said method comprising the steps of:

registering the identification of the present location of the addressee by performing a predetermined dialling operation from an extension telephone, other than the extension telephone allotted to the addressee, within the area covered by said private branch exchange;



storing in a memory the identification of the registered location of the addressee;

transferring to a switchboard any call directed to the extension telephone allotted to the addressee; and

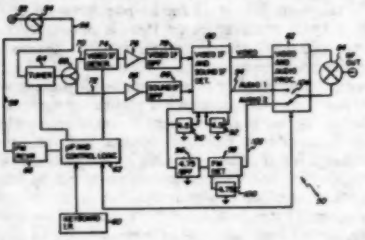
indicating at the switchboard the identification of the registered location of the addressee as stored in the memory.

4,956,862

METHOD OF PROVIDING SOUND PRIVACY SYSTEM COMPATIBLE WITH MONO AND BTSC STEREO AUDIO

Clyde Robbins, Maple Glen, and John Schilling, Dresher, both of Pa., assignors to General Instrument Corporation, New York, N.Y.

Filed Feb. 2, 1989, Ser. No. 305,785
Int. Cl.[5] H04N 7/16, 7/167
U.S. Cl. 380—19 **16 Claims**



1. A method for providing an audio signal in an approximately 6 MHz radio frequency channel of a television signal, said method comprising the steps of:

generating a video signal having an approximately 4.25 MHz bandwidth for inclusion in said channel;

generating an audio signal;

generating a first, unmodulated carrier signal at approximately 4.5 MHz for inclusion in said channel;

generating a second carrier signal offset in frequency from the first carrier signal for inclusion in said channel; and

modulating the second carrier signal with the audio signal; wherein:

the video signal includes a picture carrier having a signal level;

the first, unmodulated carrier is at a signal level below the level of the video signal; and

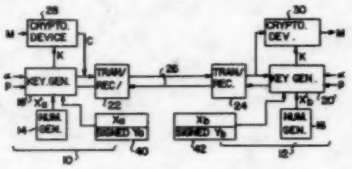
the second carrier is at a signal level between the level of the video signal and the level of the first, unmodulated carrier.

4,956,863

CRYPTOGRAPHIC METHOD AND APPARATUS FOR PUBLIC KEY EXCHANGE WITH AUTHENTICATION

Kenneth C Goss, Oceano, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Apr. 17, 1989, Ser. No. 339,555
Int. Cl.[5] H04K 1/00
U.S. Cl. 380—30 **16 Claims**



1. A secure key generator, comprising:

storage means for storing a number of a first type selected prior to placing the key generator in service, and a digitally signed composite quantity containing both a unique and publicly known identifier of the key generator and a number of a second type obtained by a practically irreversible transformation of the number of the first type;

a first input connected to receive the number of the first type;

a second input connected to receive an input quantity transmitted over an insecure communications channel from another key generator, the input quantity being digitally signed and containing both a publicly known identifier of the other key generator and a number of the second type generated by a practically irreversible transformation of a number of the first type stored in the other key generator;

a first output for transmitting the stored, digitally signed composite quantity over the insecure communications channel to the other key generator;

a second output;

means for decoding the signed input quantity received at the second input, to obtain the identifier of the other key generator and the received number of the second type; and

means for generating a session key at the second output, by performing a practically irreversible transformation of the number of the second type received through the second input, using the number of the first type received through the first input.

4,956,864

RECEIVER FOR COMMUNICATIONS SATELLITE DOWN-LINK RECEPTION

Milton H. Brockman, 825 Daphne Ct., Carlsbad, Calif. 92009

Continuation-in-part of Ser. No. 6,900, Jan. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 783,697, Oct. 3, 1985, abandoned. This application Jul. 17, 1987, Ser. No. 74,954
Int. Cl.[5] H04B 7/02, 1/10
U.S. Cl. 380—34 **18 Claims**

17. A frequency diversity receiver for secure communications satellite, transmissions of modulated carrier signals derived from a phase stable carrier having a residual level that is a few percent of total signal power, wherein a transmission is segmented and scrambled for secrecy on the carriers and is unscrambled by those permitted access, which comprises:

a plurality of antennas simultaneously receiving a plurality of modulated carrier signals, each carrier having a different frequency and modulation segments modulated thereon in accordance with a scrambling algorithm;

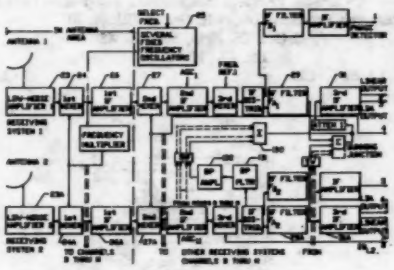
a plurality of heterodyne receiver channels including a main receiver channel and at least one branch receiver channel,

said receiver channels connected to separate antennas of said plurality of antennas, said receiver channels each including a mixer, and an intermediate frequency amplifier having a wide band modulation output and a narrow band filter and limiter producing a limited, carrier output;

a carrier phase locked loop local oscillator including coherent frequency offset means distributing a unique frequency, offset from the main receiver local oscillator frequency, to each branch receiver at the mixers thereof;

a first summing junction for combining said narrow band output of said plurality of heterodyne receiver channels into a spectrum coupled to said phase locked loop local oscillator for maintaining phase coherence of all of said plurality of heterodyne receiver channels;

a second summing means for summing amplified uncorrelated predetection receiver noise of the branch receivers,



outside the bandpass filter bandwidth of the branch receivers, coupled to the main receiver channel narrow band limited carrier IF amplifier;

detector means demodulating said wideband intermediate frequency output from each receiver channel, said detector means having an output for each receiver channel;

a third summing junction for combining said wideband demodulated intermediate frequency outputs of said detector means in said plurality of receiver channels, said junction having an output; and

unscrambling means connected to said third summing junction output for unscrambling said wideband demodulated intermediate frequency output of said detector means in accordance with said algorithm;

whereby segments of the original signal modulated on the carrier signals, are received on different frequencies and reconstructed to duplicate the original signal.

4,956,865

SPEECH RECOGNITION

Matthew Lennig; Paul Mermelstein, both of Montreal, and Vishwa N. Gupta, Brossard, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Continuation of Ser. No. 697,109, Feb. 1, 1985, abandoned. This application May 2, 1988, Ser. No. 191,824

Int. Cl.[5] G10L 7/08, 9/02

U.S. Cl. 381—43 **10 Claims**

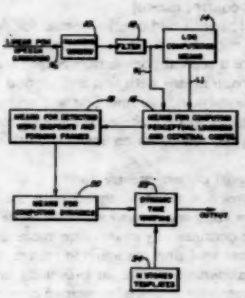
1. A method of recognizing an unknown speech utterance comprising the steps of:

(i) representing said unknown speech utterance as a first sequence of parameter frames, each parameter frame representing a corresponding time frame of said utterance;

(ii) providing a plurality of reference templates, each comprising a second sequence of parameter frames expressed in the same kind of parameters as the first sequence of parameter frames;

each parameter frame of the first sequence and second sequence of parameter frames comprising a set of primary parameters and a set of secondary parameters, each of the secondary parameters representing the signed difference between corresponding primary parameters in respective parameter frames derived for different time frames;

(iii) computing a dynamic loudness component $\Delta C_{L\phi}$ from said unknown speech utterance as a secondary parameter, and providing a corresponding dynamic loudness component $\Delta T_{\cdot\phi}$ in each of said secondary parameter frames, said



dynamic loudness components being a signed rate of change in overall amplitude between frames;

(iv) comparing each of the primary and secondary parameters in the sequence of parameter frames of the unknown utterance with each reference template and determining which of the reference templates most closely resembles the unknown utterance.

4,956,866

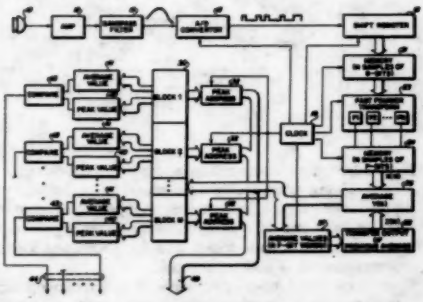
EMERGENCY SIGNAL WARNING SYSTEM

Bernard Bernstein, Phoenix, Ariz., and Guy L. Sohle, Austin, Tex., assignors to Sy/Lert System Ltd., Phoenix, Ariz.

Filed Jun. 30, 1989, Ser. No. 374,450

Int. Cl.[5] G10L 7/08; G06G 1/095

U.S. Cl. 381—43 **15 Claims**



1. A system for detecting the presence of emergency siren sound signals varying in frequency in a predetermined manner over a predetermined frequency range, said system including in combination:

a source of input signals representative of said emergency siren sound signals;

convertor means coupled with said source of input signals for providing a digital signal output in the form of signal bits representative of said input signals;

digital signal processor means coupled with said convertor means for continuously processing and storing the output of said convertor means into groups of predetermined numbers of bits of said digital signal output;

control means responsive to the storage of successive "N" (where "N" is a positive integer) groups of said predeter-

mined numbers of bits for processing each of said "N" groups of bits and providing an output signal representative of the frequency of said signals at the source of input signals for each of said "N" groups of bits;

averaging means for averaging the output signals from said control means to provide a first comparison output signal representative of the average value of the output signals from said control means;

means coupled with said control means for determining the peak values of the output signals from said control means to produce a second comparison output signal;

first comparison means with first and second inputs coupled to continuously receive said first and second comparison output signals to produce a continuous sequence of flag output signals whenever an emergency siren sound signal is present;

reference signal pattern means; and

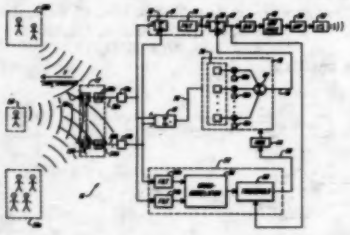
second comparison means coupled with the output of said first comparison means and said reference signal pattern means for continuously comparing successive flag output signals from said first comparison means with said reference signal pattern means for providing an alarm output signal in response to a predetermined comparison correlation.

4,956,867

ADAPTIVE BEAMFORMING FOR NOISE REDUCTION

Patrick M. Zurek, Arlington, Mass.; Julie E. Greenberg, Farmington Hills, Mich., and Patrick M. Peterson, Cambridge, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 20, 1989, Ser. No. 341,139
Int. Cl.[5] H04R 3/00
U.S. Cl. 381—94.1 **20 Claims**



1. An adaptive noise cancelling apparatus comprising:

A. a receiving array including a plurality of spatially disposed sensors, each for receiving an input signal, comprising at least one of a component of target signal and a component of a noise signal, and for generating a signal representative of said input signal,

B. primary signal means coupled with said receiving array for generating a primary signal representative of a first selected combination of one or more of said input-representative signals,

C. reference signal means coupled with said receiving array for producing one or more signals representative of a second selected combination of said input-representative signals,

D. adaptive filter means coupled to said reference signal means for generating a noise-approximating signal as a function of one or more noise component-representative signals produced during a selected period of time,

E. output means coupled to said primary signal means and to said adaptive filter means for subtracting said noise-approximating signal from said primary signal to generate an output signal representative of said target signal,

F. adaptation controlling means coupled with said receiving array for generating an SNR signal representative of a relative strength of said target signal to said noise signal, said adaptation controlling means including means coupled with said output means for generating an adaptation signal as a function of said output signal on said SNR signal, and

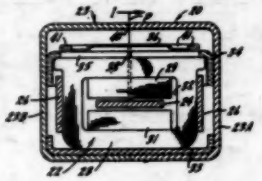
G. modification means coupled with said adaptation controlling means and with said adaptive filter means for responding to said adaptation signal to selectively modify said noise-approximating signal to minimize a difference between it and one or more selected noise components of said primary signal.

4,956,868

MAGNETICALLY SHIELDED ELECTROMAGNETIC ACOUSTIC TRANSDUCER

Elmer V. Carlson, Prospect Heights, Ill., assignor to Industrial Research Products, Inc., Elk Grove Village, Ill.

Filed Oct. 26, 1989, Ser. No. 426,999
Int. Cl.[5] H04R 1/02
U.S. Cl. 381—189 **5 Claims**



1. A magnetically shielded electromagnetic acoustic transducer comprising:

an acoustic diaphragm;

a magnetic armature;

mechanical drive connection means interconnecting the armature and the diaphragm;

an electromagnetic coil disposed in encompassing relation to a portion of the armature;

magnetic connection means linking the electromagnet coil and the armature in a complete magnetic circit having a plane of symmetry across which no appreciable magnetic flux flows;

and a magnetic shield encompassing the diaphragm, the armature, the coil, and both connection means,

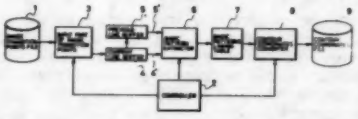
the magnetic shield comprising two generally cup-shaped casing halves of high magnetic permeability joined together along a joint plane closely adjacent to and parallel to said plane of symmetry.

4,956,869

METHOD OF TRACING CONTOUR AND A SYSTEM THEREFOR

Takafumi Miyatake, Hachiouji, and Hitoshi Matsushima, Tachikawa, both of Japan, assignors to Hitachi, Ltd.

Filed Feb. 10, 1988, Ser. No. 154,378
Int. Cl.[5] G06K 9/48
U.S. Cl. 382—22 **8 Claims**



1. A method of tracing a contour to obtain contour coordinates by extracting segments of a contour of a figure from a sampled image, comprising the steps of:

scanning said figure along sequential scanning lines in a single scanning direction;

detecting at least one image transition point for each sequential scanning line through said figure;

extracting segments of the contour of the figure by comparing a detected relationship between the position of an image transition point of each scanning line and the position of an image transition point of the adjacent preceding scanning line to a plurality of basic patterns representing different positional relationship and selecting a basic pattern corresponding to each detected relationship along the contour of the figure;

combining selected basic patterns into a basic pattern sequence on the basis of the positions of the detected image transition points; and

converting said basic pattern sequence into a sequence of contour coordinates.

4,956,870

PATTERN SELECTING DEVICE CAPABLE OF SELECTING FAVORABLE CANDIDATE PATTERNS

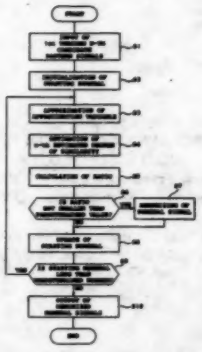
Masanori Hara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 28, 1989, Ser. No. 442,281

Claims priority, application Japan, Nov. 29, 1988, 63-299434

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—30 **8 Claims**



1. A pattern selecting device for producing an output numeral indicative of one of first through N-th candidate patterns which have first through N-th candidate degrees of similarity relative to an input pattern and are decided by a pattern collating system for collating said input pattern with a plurality of registered patterns to produce, successively in a descending order of said first through said N-th candidate degrees, first through N-th candidate pattern signals representative of said first through said N-th candidate patterns, where N represents an integer which is not less than two and is not greater than said plurality, said pattern selecting device comprising:

processing means for processing said first through said N-th candidate pattern signals to produce, when an (n+1)-th candidate pattern signal is processed, where n is variable from 1 towards N, an n-th processed signal related to said (n+1)-th through said N-th candidate degrees;

estimating means connected to said processing means for estimating an n-th estimated degree for an n-th candidate pattern with reference to said processed signal to produce an estimated signal representative of said n-th estimated degree; and

deciding means connected to said processing means and said estimating means for deciding whether or not a ratio of said n-th estimated degree to said n-th candidate degree is not smaller than a predetermined value, said deciding means thereby producing a numeral indicative of said n-th candidate pattern as said output numeral.

4,956,871

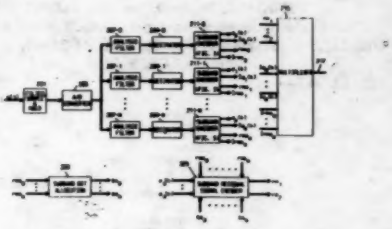
IMPROVING SUB-BAND CODING OF SPEECH AT LOW BIT RATES BY ADDING RESIDUAL SPEECH ENERGY SIGNALS TO SUB-BANDS

Kumar Swaminathan, Randolph, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 30, 1988, Ser. No. 252,250

Int. Cl.[5] G10L 7/02

U.S. Cl. 381—31 **22 Claims**



1. An arrangement for coding speech comprising:

means for receiving a speech pattern;

means connected to the speech pattern receiving means for sampling the received speech pattern at a predetermined rate corresponding to the speech pattern bandwidth;

means having an input connected to the speech pattern sampling means and a plurality of outputs for dividing the spectrum of the speech pattern samples into a plurality of sub-band portions;

means connected to each spectrum dividing means output for reducing the sampling rate of the sub-band speech samples therefrom to a lower sampling rate then the predetermined rate;

means connected to each reducing means ouptput for grouping the sub-band speech samples from the spectrum dividing means into successive time frame intervals of K+1 speech samples;

means connected to the grouping means responsive to the K+1 sub-band speech samples of the present time frame interval for generating a signal representative of the energy of the sub-band speech of the time frame interval in each sub-band;

means responsive to the speech energy signals of a plurality of the sub-band portions for generating a set of signals allocating a predetermined number of bits to each sub-band portion;

means for coding each sub-band speech portion of the present time frame interval including means jointly responsive to the speech energy signal and the bit allocation signal of the sub-band portion for quantizing the sequence of K+1 speech samples of the sub-band;

means for generating a sequence of signals representative of the residual differences between the sub-band speech samples of the time frame interval and the corresponding quantized sub-band speech samples;

means connected to the speech energy signal generating means, the bit allocation generating means and the residual difference signal generating means responsive to the energy representive signals and the bit allocation signals of a plurality of the sub-bands for selecting at least one of the plurality of sub-bands for encoding the time frame interval residual difference signal sequence;

means connected to the sub-band selecting means for generating a coded signal representative of the sequence of

residual difference signals of the at least one selected sub-band of the time frame interval: and

means for multiplexing the quantized speech samples, the energy signals of the sub-band portions and coded signal representing the residual difference of the at least one selected sub-band portion to form a coded signal representative of the speech pattern of the time frame interval.

4,956,872

IMAGE PROCESSING APPARATUS CAPABLE OF RANDOM MOSAIC AND/OR OIL-PAINTING-LIKE PROCESSING

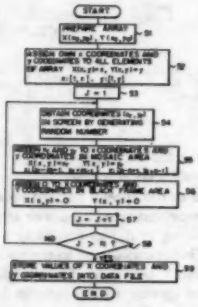
Hiroyuki Kimura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1987, Ser. No. 113,997

Claims priority, application Japan, Oct. 31, 1986, 61-258605; Oct. 31, 1986, 61-258606; Oct. 31, 1986, 61-258607

Int. Cl.[5] G06K *9/36*

U.S. Cl. 382—44 **12 Claims**



1. An image processing method for converting image data of a plurality of pixels in a predetermined block into image data of a representative pixel in the predetermined block of an original image, comprising the steps of:

randomly designating the representative pixel;

converting a plurality of coordinate values of a plurality of pixels in the predetermined block into a coordinate value of the representative pixel, and storing the converted coordinate value in a coordinate file;

executing said designating step and said converting-and-storing step plural times, once for each block of the original image, to complete the coordinate file, wherein said executing step further includes the step of changing the position of the predetermined block on the basis of a position of the representative pixel randomly designated in said designating step;

storing an original image comprising image data of a plurality of pixels; and

converting image data of each pixel of the original image into image data of a pixel in the same block and corresponding to the representative pixel of that block stored in said coordinate file.

4,956,873

IMAGE PROCESSING APPARATUS

Mark A. Samuels, Hockley, and Stephen Dimmick, Rayleigh, both of United Kingdom, assignors to GEC-Marconi Limited, Stanmore, United Kingdom

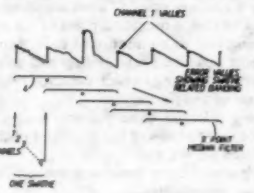
Filed Jun. 6, 1988, Ser. No. 202,634

Claims priority, application United Kingdom, Jun. 5, 1987, 8713194

Int. Cl.[5] G06K *9/40*

U.S. Cl. 382—54 **11 Claims**

1. Apparatus for processing an image, which image is of the type comprising a plurality of lines which together form a representation of the image, comprising, means for deriving a first set of values, each value being representative of a predetermined parameter of each image line; set of values, each respective second value being substantially representative of



an artifact image for each respective line; means for deriving from the second set of values a set of correction values for applying to the image; and means for applying the correction values to the image.

4,956,874

METHOD AND APPARATUS FOR PROCESSING DIGITIZED IMAGES

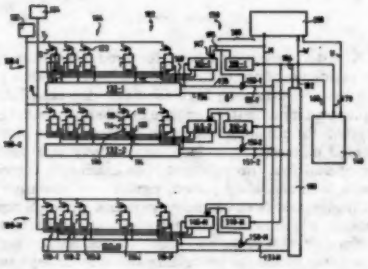
Jean Appel, Vanves, France, assignor to Office National d'Etudes et de Recherche Aerospatiales (ONERA), Chatillon, France

Filed Mar. 7, 1988, Ser. No. 164,801

Claims priority, application France, Mar. 16, 1987, 87 03573

Int. Cl.[5] G06K *9/36*

U.S. Cl. 382—56 **9 Claims**



1. Apparatus for processing digitized images comprising:

a matrix memory of pixels having N number of lines by P number of columns where N and P are integer values; and processing means for determining which pixels are in the excited state and for storing the address of said excited pixels occupying an extreme position in a line or a column and by switching said pixel to a non-excited state, and by reiterating these operations until none of the pixels is excited; and

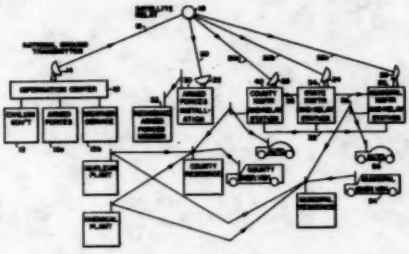
an output memory adapted to store the addresses of said excited pixels received from said processing means.

4,956,875

EMERGENCY RADIO ALERTING AND MESSAGE TRANSMITTING SYSTEM DIRECTABLE TO SELECTED CLASSES AND NUMBERS OF RECEIVERS

William B. Bernard, Longboat Key, and William B. Minteer, Bradenton, both of Fla., assignors to Com-Ser Laboratories, Inc., Sarasota, Fla.

Filed Jul. 5, 1988, Ser. No. 215,011
Int. Cl.[5] H04B 7/14, 7/24
U.S. Cl. 455—13 4 Claims



1. In an emergency radio alerting and warning system directable to selected classes and numbers of receivers, the system comprising at least one FM radio transmitter for broadcasting modulated signals in a selected FM band and a plurality of cooperating FM radio receivers energized at all times and tuned for receiving broadcast signals in the selected FM band and each receiver having an audio circuit functioning in response to the modulated signals, the improvement comprising a plurality of encoders in the FM transmitter, at least one encoder settable to generate a first series of signal pulses which when broadcast and received by the FM receivers and demodulated will activate the audio circuit in a large selected group of the plurality of FM receivers, at least one other encoder in the transmitter for generating another series of signal pulses that when demodulated will fully activate only selected ones of a smaller number of the plurality of FM receivers, whereby alerting and warning messages may be transmitted from the FM transmitter and received only by the fully activated selected FM receivers, and means in the FM transmitter for generating alerting and warning modulating signals which upon reception by the FM receivers that are fully activated will cause warning means associated with the FM receivers to alert anyone in the vicinity that an emergency situation has arisen, and message means in the FM transmitter for broadcasting a message in the FM band only to the selected fully activated FM receivers, and means in the FM transmitter for so modulating the FM band as to broadcast in sequence a series of encoded pulses for fully activating selected FM receivers, the alerting and warning signals, and finally an audio message, and timer means in each receiver in each FM receiver operable upon receipt by a decoder of a coded signal pulse to activate audio circuit for a selected brief period and at the end of this period the timer means inactivates the audio circuit.

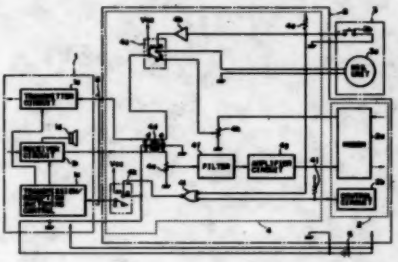
4,956,876

DC DECOUPLED RADIO COMMUNICATION SYSTEM

Takaho Koshiishi, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,690
Claims priority, application Japan, Dec. 15, 1987, 62-315156
Int. Cl.[5] H04B 1/44
U.S. Cl. 455—78 6 Claims

1. A radio communication system comprising:
a radio unit including a transmitter circuit, a receiver circuit and selecting means for selecting either one of said transmitter and receiver circuits for operation;
a microphone unit;
a data communication unit; and
an interface circuit including a d.c. decoupling means having a first side operatively coupled to said transmitter and receiver circuits and a second side which is d.c. decoupled from said first side to prevent the passing of noise, a first switching means selectively connecting said second side to one of said microphone unit and said data communication unit, and a second switching means for selectively switching between a transmission mode and a reception mode and thus supplying a mode select signal to said selecting means.

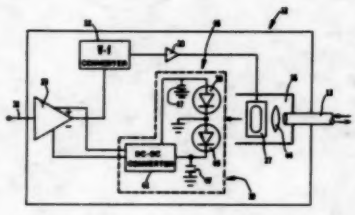


4,956,877

OPTICAL FIBER REFLECTIVE SIGNAL MODULATION SYSTEM

Mark W. Kroll, Minnetonka, and Mark R. Pommrehn, Eden Prairie, both of Minn., assignors to Cherne Medical, Inc., Edina, Minn.

Filed Jun. 10, 1987, Ser. No. 60,740
Int. Cl.[5] H04B 10/00
U.S. Cl. 455—605 31 Claims



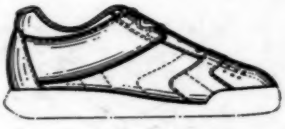
1. A signal modulation system comprising:
a. an optical fiber;
b. a first station communicatively connected to said optical fiber and having means to transmit an unmodulated light carrier signal through said optical fiber, and first means to convert a modulated light carrier signal from said optical fiber to a demodulated electrical signal for output, said first station further having means to separate said unmodulated light carrier signal and said modulated light carrier signal; and
c. a second station communicatively connected to said optical fiber and having at least one terminal to receive an electrical input signal, an amplifier connected to said at least one terminal, a power source connected to said amplifier, a digital modulator connected to said amplifier and converting said input signal to a modulating signal, an optical shutter constructed and arranged to modulate and reflect said unmodulated light carrier signal emitted from said optical fiber back to said optical fiber, said optical shutter being responsive to said modulating signal, and means to direct both said unmodulated light carrier signal emitted from said optical fiber to said optical shutter, and said modulated light carrier signal reflected to said optical fiber.

DESIGNS

SEPTEMBER 11, 1990

310,440
CONFECTION
Salvatore A. Puglisi, Wayne, and Carolina Calayan, Morris Plains, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed May 28, 1987, Ser. No. 56,208
Term of patent 14 years
U.S. Cl. D1—127

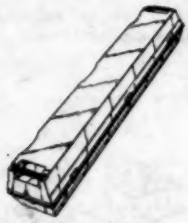
310,441
WEIGHTED SHOE UPPER
S. Altaf Ali, Bell Air, Md., and Jack W. Harmon, Guttenberg, N.J., assignors to San Shoe Trading Corp., New York, N.Y.
Filed Dec. 4, 1987, Ser. No. 130,336
Term of patent 14 years
U.S. Cl. D2—314

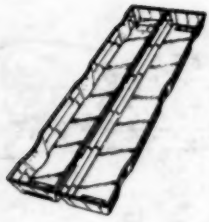


310,442
ATHLETIC SHOE UPPER AND MIDSOLE
Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc., Beaverton, Oreg.
Filed Apr. 3, 1990, Ser. No. 504,414
Term of patent 14 years
U.S. Cl. D2—314

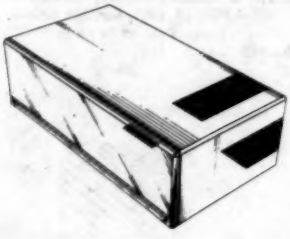
310,443
HEEL LIFT
William A. Lobosco, West Lebanon, N.H., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed May 14, 1987, Ser. No. 50,344
Term of patent 14 years
U.S. Cl. D2—323

310,444
CONTAINER FOR DRILLING CORE
Finn Utsola, Karisto 14 B, N-4040 Madla, Norway
Filed Jan. 30, 1987, Ser. No. 9,142
Claims priority, application Norway, Sep. 26, 1986, 67689
Term of patent 14 years
U.S. Cl. D3—30.1

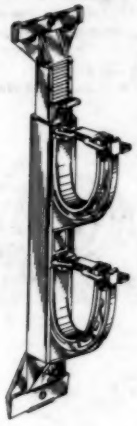




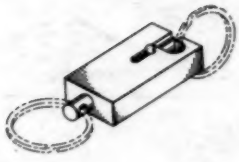
310,445
COMPACT DISC FILE
Jerry M. Long, Pleasant, and Peter W. Palmer, San Jose, both of Calif., assignors to Creative Point, Inc., Fremont, Calif.
Filed Sep. 5, 1986, Ser. No. 904,265
Term of patent 14 years
U.S. Cl. D3—35

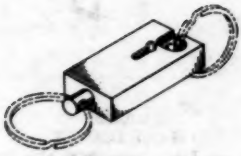


310,446
GUN RACK FOR A VEHICLE
Johnny C. Elkins, Rte. 5, Box 512C, San Angelo, Tex. 76904
Filed Feb. 2, 1987, Ser. No. 10,146
Term of patent 14 years
U.S. Cl. D3—38



310,447
KEY RING HOLDER
Sumner MacDonald, P.O. Box 2552, Providence, R.I. 02906
Filed May 7, 1987, Ser. No. 46,863
The portion of the term of this patent subsequent to Aug. 28, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—61



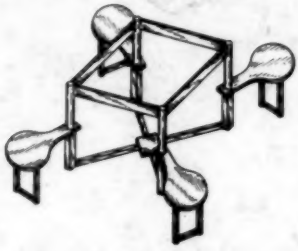


310,449
COMBINATION KEY RING AND PEN
Galoppo Agrippino, Via Crosetto No. 13/A, Grugliasco, Torino, Italy
Filed Jun. 5, 1987, Ser. No. 58,544
Term of patent 14 years
U.S. Cl. D3—62

310,448
KEY RING
Frank Scognamillo, 28W168 Marion, Winfield, Ill. 60190, and Jay C. Covington, 8525 Clarendon Hills Rd., Hinsdale, Ill. 60521
Continuation-in-part of Ser. No. 922,545, Oct. 23, 1986. This application Sep. 21, 1988, Ser. No. 247,306
The portion of the term of this patent subsequent to Sep. 4, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—61

310,450
LUGGAGE CASE
Renato P. Castelli, Gent; Willibald Van Hoye, Zwijnaarde, both of Belgium; Richard Miles, Crowborough, and Stephen T. Green, Oxford, both of England, assignors to Samsonite Corporation, Denver, Colo.
Filed Apr. 30, 1986, Ser. No. 858,295
Claims priority, application United Kingdom, Oct. 31, 1985, 1030155
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—76

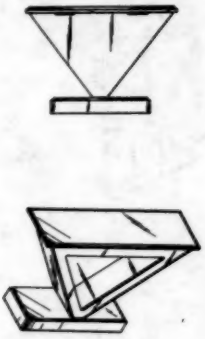
310,451
COMBINED TABLE TOP SUPPORT AND MULTIPLE SEATING UNIT
Thomas E. Webb, Rte. 1, Box 78, Arkansaw, Wis. 54721
Filed Apr. 13, 1987, Ser. No. 37,454
Term of patent 14 years
U.S. Cl. D6—337



310,452
CHAISE LOUNGE
Hans Hopfer, Paris, France, assignor to Alex Synn AG, Cham, Switzerland
Filed Mar. 7, 1988, Ser. No. 165,163
Term of patent 14 years
U.S. Cl. D6—361

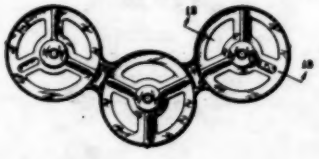
310,453
CHAIR
Warren H. Snodgrass, 223 Woodland Rd., Kentfield, Calif. 94904
Filed Nov. 4, 1986, Ser. No. 927,305
The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—372

310,454
MEMORIAL FLAG DISPLAY CASE
Hollis R. Beasley, Bay Dr. No 29, Niceville, Fla. 32578
Filed Oct. 31, 1988, Ser. No. 265,125
Term of patent 14 years
U.S. Cl. D6—470



310,455
MOUNTING FITTING FOR A SHELF
Lars Larsson, Herrljunga, Sweden, assignor to Herrljunga Formplast AB, Herrljunga, Sweden
Filed Dec. 17, 1986, Ser. No. 942,825
Claims priority, application Sweden, Jun. 17, 1986, 86-1469
Term of patent 14 years
U.S. Cl. D6—491

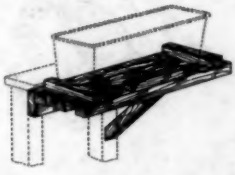
310,456
TOP FOR MERCHANDISE DISPLAY UNIT
Dale Hodgson, Parma, and John Straw, Stronsville, both of Ohio, assignors to American Greetings Corporation, Cleveland, Ohio
Filed Mar. 12, 1987, Ser. No. 25,015
Term of patent 14 years
U.S. Cl. D6—491



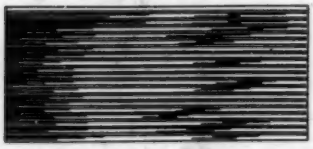
310,457
GENERAL PURPOSE RACK
Neo Heap, Selangor Darul Ehsan, Malaysia, assignor to Kbl (Malaysia) SDN. BHD, Selangor Darul Ehsan, Malaysia
Filed Dec. 30, 1988, Ser. No. 292,514
Claims priority, application United Kingdom, Jul. 12, 1988, 1052253
Term of patent 14 years
U.S. Cl. D6—525

310,458
COMBINED TOOTHBRUSH AND TUMBLER HOLDER
E. Pekka Korpijaakko, Rocky Hill, N.J., assignor to The Willette Corporation, New Brunswick, N.J.
Filed Jan. 4, 1988, Ser. No. 140,833
Term of patent 14 years
U.S. Cl. D6—531

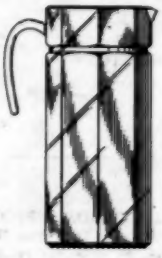
310,459
FLOWER BOX SUPPORT
Thomas A. Gipe, 3710 Evans Trail Way, Beltsville, Md. 20705
Filed Feb. 29, 1988, Ser. No. 161,887
Term of patent 14 years
U.S. Cl. D6—556



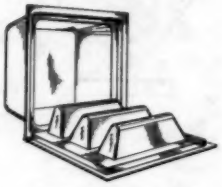
310,460
BATHROOM MAT OR SIMILAR ARTICLE
Baldo Vergnano, Corso Orbassano 462/A, Turin, Italy
Filed Oct. 30, 1986, Ser. No. 925,877
Claims priority, application Italy, Jan. 27, 1986, 53573/86[U]
Term of patent 14 years
U.S. Cl. D6—583



310,461
PITCHER
Jean-Jacques Durand, LaBute, 62510, Arques, France
Filed Oct. 20, 1987, Ser. No. 110,487
Term of patent 14 years
U.S. Cl. D7—318

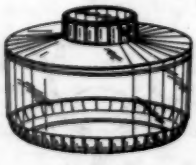


310,462
FOOD SUPPORT
E. David Schoen, 14256 Chestnut Dr., Eden Prairie, Minn. 55347
Continuation-in-part of Ser. No. 225,143, Jul. 28, 1988. This application Dec. 27, 1988, Ser. No. 289,763
Term of patent 14 years
U.S. Cl. D7—504

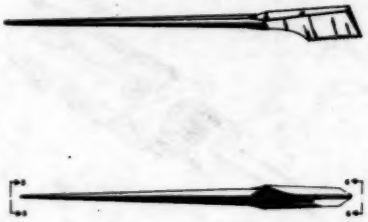


310,463
COVERED DISH SET OR THE LIKE
Douglas M. Laib, Blackstone, Mass., assignor to Dart Industries Inc., Deerfield, Ill.
Filed Nov. 22, 1988, Ser. No. 275,142
Term of patent 14 years
U.S. Cl. D7—614

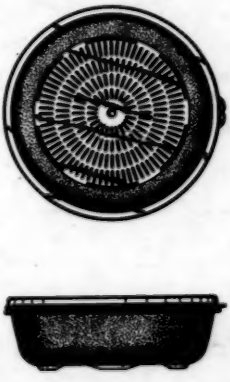
310,464
COVERED DISH OR THE LIKE
Douglas M. Laib, Blackstone, Mass., assignor to Dart Industries Inc., Deerfield, Ill.
Filed Nov. 22, 1988, Ser. No. 275,143
Term of patent 14 years
U.S. Cl. D7—615



310,465
CHOP STICK KNIFE
Donald Bonanis, 100 N. Clark Dr. #103, Los Angeles, Calif. 90048
Filed Dec. 21, 1987, Ser. No. 135,286
Term of patent 14 years
U.S. Cl. D7—644



310,466
COLANDER OR THE LIKE
Rino Conti, Stoughton, Mass., assignor to Dart Industries Inc., Deerfield, Ill.
Continuation of Ser. No. 9,402, Jan. 30, 1987, abandoned. This application Oct. 31, 1989, Ser. No. 429,905
Term of patent 14 years
U.S. Cl. D7—667

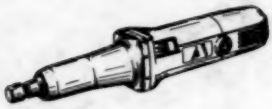


310,467
GOLF CLUB SHAFT EXTRACTOR
Gary R. Taylor, 812 E. Aloha St., Camarillo, Calif. 93010
Filed Nov. 27, 1987, Ser. No. 126,287
Term of patent 14 years
U.S. Cl. D8—14

310,468
INTEGRATED CIRCUIT INSERTION TOOL
Yee C. Feng, 5F-1, No. 189, Chang An E. Rd., Sec. 2, Taipei, Taiwan
Filed Aug. 3, 1988, Ser. No. 228,209
Term of patent 14 years
U.S. Cl. D8—14

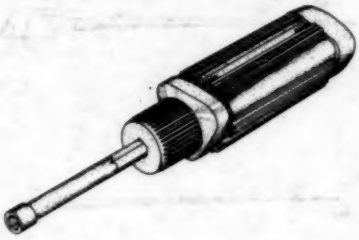
310,469
SCISSORS
Bernd J. Dressler, 408 Bryant Cir., Suite A, Ojai, Calif. 93023
Filed Jul. 27, 1988, Ser. No. 224,891
Term of patent 14 years
U.S. Cl. D8—57

310,470
PORTABLE ELECTRIC GRINDER
Masaharu Tohdoh, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan
Filed Sep. 8, 1987, Ser. No. 94,790
Claims priority, application Japan, Mar. 9, 1987, 62-8997
Term of patent 14 years
U.S. Cl. D8—62



310,471
CLAMP FOR POLISH ROD LINER OF AN OIL WELL PUMPING UNIT
Jimmie R. Kuykendall, 1349 Chimney Hill Rd., Yukon, Okla. 73099
Filed Oct. 23, 1987, Ser. No. 113,190
Term of patent 14 years
U.S. Cl. D8—72

310,472
NUT DRIVER
William G. Mader, York, Pa., and Paul J. Rowean, West Hartford, Conn., assignors to Easco Hand Tool, Inc., Hunt Valley, Md.
Filed May 17, 1989, Ser. No. 352,908
Term of patent 14 years
U.S. Cl. D8—82



310,473
DIAMOND FILE
Yasuharu Takeda, and Yutaka Kanamaru, both of Tokyo, Japan, assignors to Ryoki Ltd., Hiroshima, Japan
Filed Oct. 2, 1987, Ser. No. 103,973
Term of patent 14 years
U.S. Cl. D8—90

310,474
RETRACTABLE DOUBLE BLADE KNIFE
Daniel Bartsch, and Jane A. Bartsch, both of 704 Lincoln St., McMechen, W. Va. 26040
Filed Jan. 19, 1988, Ser. No. 145,198
Term of patent 14 years
U.S. Cl. D8—99

310,475
CARPET KNIFE HANDLE
George F. Weimann, Avon, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Feb. 8, 1988, Ser. No. 153,026
The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—99

310,476
WEATHER-RESISTANT ASSEMBLY FOR PROTECTING OUTDOOR DUPLEX ELECTRICAL RECEPTACLES
David Grenell, North Woodmere, N.Y., assignor to Greenfield Diecasting Corp., Freeport, N.Y.
Filed Jun. 25, 1987, Ser. No. 66,403
Term of patent 14 years
U.S. Cl. D8—353

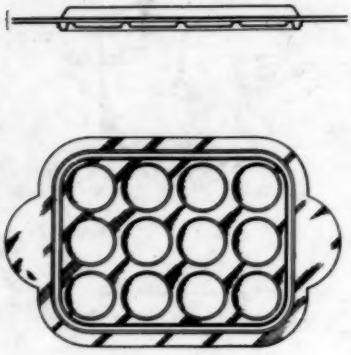
310,477
LAWN SPRINKLER SUPPORT
Gregory E. Fleecs, R.R. #1, Box 39, Sutherland, Nebr. 69165
Filed Feb. 2, 1987, Ser. No. 10,234
Term of patent 14 years
U.S. Cl. D8—356

310,478
WALL MOUNT FOR A PH METER OR SIMILAR ARTICLE
Karen Lang, La Habra, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed Sep. 16, 1987, Ser. No. 97,468
Term of patent 14 years
U.S. Cl. D8—373

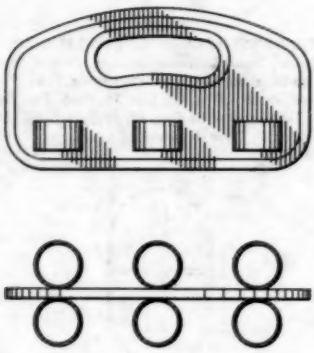
310,479
FOLDING HANGER RACK
Arthur J. Speetzen, 17315 Hillview, Spring, Tex. 77379
Filed Jun. 24, 1988, Ser. No. 153,651
Term of patent 14 years
U.S. Cl. D8—376

310,480
DISPENSER FOR SCENTED LIQUIDS
Reinold Geiger, Saint-Germain-en-Laye, France, assignor to Ateliers de Moulage Specialise Packaging, France
Division of Ser. No. 776,289, Sep. 16, 1985, Pat. No. Des. 299,694. This application Oct. 13, 1988, Ser. No. 257,039
Term of patent 14 years
U.S. Cl. D9—300

310,481
PACKAGE
Arthur Channel, Saint-Remy Pollist, France, assignor to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole, Servas, France
Filed Feb. 16, 1988, Ser. No. 155,766
Claims priority, application France, Aug. 12, 1987, 874,780
Term of patent 14 years
U.S. Cl. D9—341



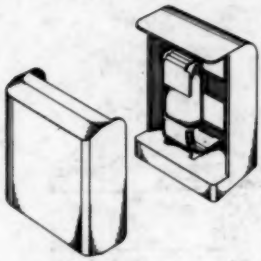
310,482
CARRIER FOR BABY BOTTLES
Edmund Smith, P.O. Box 754, Intervale, N.H. 03485
Filed Mar. 31, 1988, Ser. No. 176,405
Term of patent 14 years
U.S. Cl. D9—344



310,483
COMBINED BOTTLE AND CLOSURE
Henri C. De Giovellina, Paris, France, assignor to Pochet S.A., Paris, France
Filed Jun. 3, 1988, Ser. No. 202,904
Claims priority, application France, Dec. 4, 1987, 877258
Term of patent 14 years
U.S. Cl. D9—377

310,484
DECANTER WITH STOPPER
Michel Dancourt, Cognac, France, assignor to Camus La Grande Marque, Cognac, France
Filed Mar. 24, 1988, Ser. No. 172,652
Term of patent 14 years
U.S. Cl. D9—384

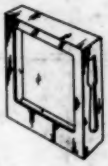
310,485
WATCH DISPLAY CASE
Thomas J. Harvey, Pawtucket, R.I., assignor to International Packaging Corporation, Pawtucket, R.I.
Filed Oct. 5, 1987, Ser. No. 104,811
Term of patent 14 years
U.S. Cl. D9—424



310,486
PACKAGE
Arthur Chanel, Saint-Rémy Polliat, France, assignor to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole, Servas, France
Filed Feb. 12, 1988, Ser. No. 155,637
Claims priority, application France, Aug. 12, 1987, 874780
Term of patent 14 years
U.S. Cl. D9—425

310,487
TOOTHPASTE TUBE OR THE LIKE
Donald M. Genaro, Haworth, N.J., assignor to Henry Dreyfuss Associates, New York, N.Y.
Filed May 25, 1988, Ser. No. 200,172
Term of patent 14 years
U.S. Cl. D9—371

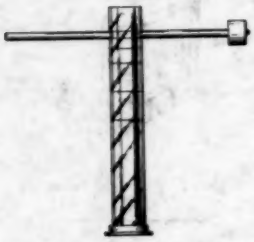
310,488
PACKAGE
Christopher J. Callinan, Centerport, N.Y., assignor to Regent Sheffield, Ltd., Farmingdale, N.Y.
Filed Dec. 29, 1987, Ser. No. 139,042
Term of patent 14 years
U.S. Cl. D9—418



310,489
CLOCK
Keiko Nomura, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Sep. 10, 1986, Ser. No. 905,941
Claims priority, application Japan, Mar. 12, 1986, 61-8822
Term of patent 14 years
U.S. Cl. D10—24

310,490
WRISTWATCH
Wa N. Fong, Hong Kong, Hong Kong, assignor to DesignTime Company Limited, North Point, Hong Kong
Filed Mar. 11, 1987, Ser. No. 24,397
Term of patent 14 years
U.S. Cl. D10—32

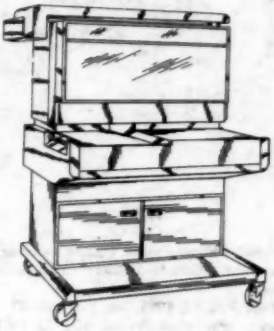
310,491
CORE SAMPLE TUBE
Dale Mitchell, 834 NW. 9th Way, Boynton Beach, Fla. 33435
Filed Jun. 26, 1987, Ser. No. 67,460
Term of patent 14 years
U.S. Cl. D10—46



310,492
HELMET PHOTODETECTOR ARRAY
Leo O. Taylor, and Fritz W. Healey, both of Alta Loma, Calif., assignors to Loral Electro-Optical Systems, Inc., Pasadena, Calif.
Filed Feb. 11, 1988, Ser. No. 155,011
Term of patent 14 years
U.S. Cl. D10—46

310,493
CRIBBAGE BOARD
P. Michael Coffee, 10936 Calavo Dr., La Mesa, Calif. 92041
Filed Jun. 16, 1987, Ser. No. 62,567
Term of patent 14 years
U.S. Cl. D10—46.1

310,494
COMPUTER ANALYZER
Robert J. Rzadzki, Schaumburg, and Lee F. Radtke, Lake Zurich, both of Ill., assignors to Sun Electric Corporation, Crystal Lake, Ill.
Filed Jan. 28, 1987, Ser. No. 8,641
Term of patent 14 years
U.S. Cl. D10—75

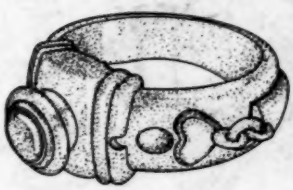


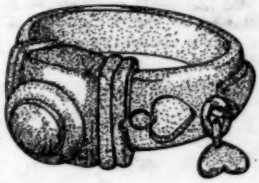
310,495
BICYCLE SPEEDOMETER
Jou Kagayama, Izumi, Japan, assignor to Cat Eye Co., Ltd., Osaka, Japan
Filed Jul. 6, 1987, Ser. No. 69,620
Claims priority, application Japan, Jan. 8, 1987, 62-348
Term of patent 14 years
U.S. Cl. D10—98

310,496
ALERT SIGNAL FOR WAFFLE IRONS
Joseph D. Timpone, 654 E. 87 St., Brooklyn, N.Y. 11236
Filed Feb. 25, 1988, Ser. No. 160,104
Term of patent 14 years
U.S. Cl. D10—106

310,497
ROAD MARKER
Albert M. Provence, Jr., 735 S. El Molino, Pasadena, Calif. 91106
Filed Apr. 25, 1988, Ser. No. 185,931
Term of patent 14 years
U.S. Cl. D10—109

310,498
ORNAMENTAL RING
André Méjias, Vevey, Switzerland, assignor to Premiere de Tabbah, S.A., Fribourg, Switzerland
Filed Jan. 25, 1988, Ser. No. 148,221
Claims priority, application Int'l Pat. Institute, Jul. 23, 1987, DMA/000/645
Term of patent 14 years
U.S. Cl. D11—35

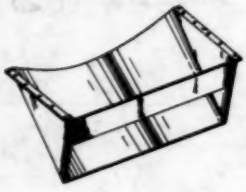




310,499
CHRISTMAS TREE STAND
Allen C. Grzebyk, 5009 Chippewa Ct., Sterling Heights, Mich. 48310
Filed Feb. 17, 1987, Ser. No. 15,230
Term of patent 14 years
U.S. Cl. D11—130.1

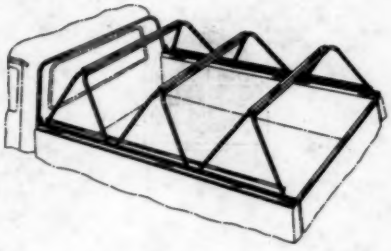
310,500
CHRISTMAS TREE STAND
Jaroslav Matousek, Vilintorpsvägen 17, S-255 90 Helsingborg, Sweden
Filed Aug. 10, 1988, Ser. No. 231,832
Claims priority, application Sweden, Feb. 10, 1988, 88-0299
Term of patent 14 years
U.S. Cl. D11—130.1

310,501
TRACTOR TRAILER AIR CHUTE
Lyle W. Brys, 1465 Glencoe, Denver, Colo. 80220
Filed Jul. 14, 1987, Ser. No. 72,845
Term of patent 14 years
U.S. Cl. D12—97

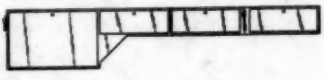


310,502
SHADE FOR AN AUTOMOBILE STEERING WHEEL AND SEAT
Robert J. Gantner, 550 Sheridan Sq., Evanston, Ill. 60202
Filed Dec. 27, 1988, Ser. No. 289,754
Term of patent 14 years
U.S. Cl. D12—155

310,503
FRAME UNIT FOR TRUCK BED COVER
A. Edward Moore, 215 Grandpre, l'Arcadie, Quebec, Canada J0J 1H0
Filed Mar. 11, 1988, Ser. No. 166,614
Term of patent 14 years
U.S. Cl. D12—156

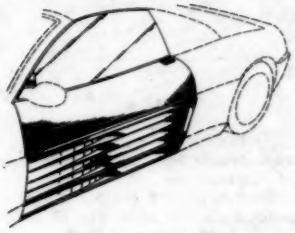


310,504
TOOL BOX DRAWER FOR PICKUP TRUCK
Laurence E. Dortch, P.O. Box 74, Pratt, Kans. 67124
Filed Nov. 2, 1988, Ser. No. 266,354
Term of patent 14 years
U.S. Cl. D12—157



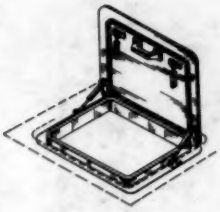
310,505
SIDE MIRROR FOR VEHICLES
Kenichiro Unno, Tokyo, Japan, assignor to Tanaka Manufacturing Company Limited, Tokyo, Japan
Filed Feb. 18, 1987, Ser. No. 15,955
Claims priority, application Japan, Aug. 20, 1986, 61-32416
The portion of the term of this patent subsequent to Jul. 16, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—187

310,506
AUTOMOBILE DOOR PANEL EXTERIOR SURFACE
Leonardo Fioravanti, Moncalieri, Italy, assignor to Fabriche Automobile Ferrari Societa per Azioni Esercizio, Modena, Italy
Division of Ser. No. 912,493, Sep. 29, 1986. This application Mar. 22, 1989, Ser. No. 327,186
Claims priority, application Italy, Mar. 29, 1986, 65206/86
Term of patent 14 years
U.S. Cl. D12—196



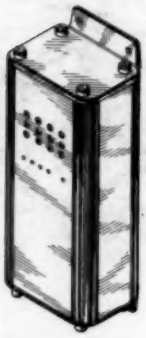
310,507
SPARE TIRE HOLDER
Ira J. Ware, Rte. 4, Box 143, Seminole, Okla. 74868
Filed Jul. 17, 1987, Ser. No. 74,497
The portion of the term of this patent subsequent to Jul. 3, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—202

310,508
BOAT HATCH
Allan Brown, North Miami Beach; Robert B. Gowens, Plantation, and Valentine Jenkins, Pembroke Lakes, all of Fla., assignors to Cigarette Racing Team, Inc., North Miami Beach, Fla.
Continuation-in-part of Ser. No. 792,974, Oct. 30, 1985. This application Sep. 10, 1987, Ser. No. 95,513
Term of patent 14 years
U.S. Cl. D12—317

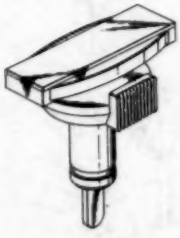


310,509
PORTABLE BATTERY CASE
Fusao Fushiya, and Hajime Ohta, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan
Filed Apr. 4, 1988, Ser. No. 177,030
Claims priority, application Japan, Nov. 5, 1987, 62-45153
Term of patent 14 years
U.S. Cl. D13—103

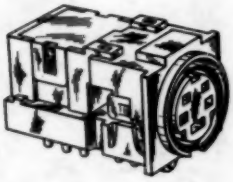
310,510
DEFAULT CONTROLLER FOR RAILWAY VEHICLES
Angel P. Bezos, Rockville, Md., assignor to Pulse Electronics, Inc., Rockville, Md.
Filed Sep. 9, 1988, Ser. No. 242,069
Term of patent 14 years
U.S. Cl. D13—128



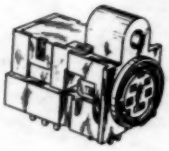
310,511
ADAPTER FOR A TRACK LIGHT
Lou Bedocs, Bishops Stortford, England, and Michael C. Eksteen, Verwoerdburg, South Africa, assignors to Thorn EMI plc, London, England
Filed Jun. 12, 1987, Ser. No. 60,894
Claims priority, application South Africa, Dec. 12, 1986, 86/1066
Term of patent 14 years
U.S. Cl. D13—133



310,512
CONNECTOR SOCKET
Kyousuke Tajima, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd, Osaka, Japan
Filed Feb. 16, 1988, Ser. No. 155,937
Claims priority, application Japan, Aug. 24, 1987, 62-34525
Term of patent 14 years
U.S. Cl. D13—146



310,513
CONNECTOR SOCKET
Kyousuke Tajima, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan
Filed Feb. 16, 1988, Ser. No. 155,938
Claims priority, application Japan, Aug. 19, 1987, 62-33737
Term of patent 14 years
U.S. Cl. D13—146

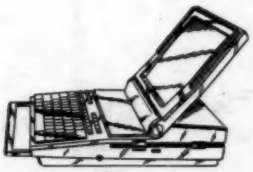


310,514
CHIP CARTRIDGE
Bernard Maurer, Melrose; Robert Faranda, Acton, and Thomas G. Wu, Lexington, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Apr. 23, 1987, Ser. No. 41,588
Term of patent 14 years
U.S. Cl. D13—182

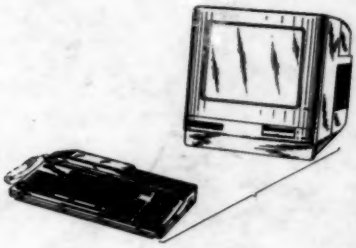
310,515
SHOP FLOOR DATA TERMINAL OR THE LIKE
James S. Bianco, 217 Brainard Rd., Enfield, Conn. 06082
Filed Oct. 19, 1987, Ser. No. 109,853
Term of patent 14 years
U.S. Cl. D14—100

310,516
COMPUTER KEYBOARD
Masaki Hara; Masayuki Sakai, and Minoru Kato, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 30, 1988, Ser. No. 175,220
Claims priority, application Japan, Oct. 22, 1987, 62-43268
Term of patent 14 years
U.S. Cl. D14—100

310,517
PORTABLE COMPUTER
Masaki Hara; Masayuki Sakai; Masaharu Sawatani; Midori Yonezawa, and Katsuo Fukuyama, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 18, 1987, Ser. No. 98,956
Claims priority, application Japan, May 15, 1987, 62-19068
Term of patent 14 years
U.S. Cl. D14—106



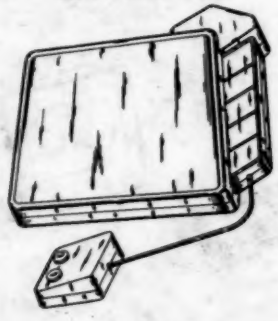
310,518
VIDEOTEX TERMINAL
Robert Dezes, Suresnes, France, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Dec. 16, 1987, Ser. No. 133,691
Claims priority, application France, Jun. 16, 1987, 873558
Term of patent 14 years
U.S. Cl. D14—106



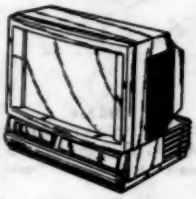
310,519
VIDEOTEX TERMINAL
Robert Dezes, Suresnes, France, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Dec. 16, 1987, Ser. No. 133,692
Claims priority, application France, Jun. 16, 1987, 873557
Term of patent 14 years
U.S. Cl. D14—106

310,520
BRACKET FOR SUSPENDING A FILTER IN FRONT OF A VIDEO MONITOR SCREEN
Paul R. Bedard, Oakville, Canada, assignor to Fellowes Manufacturing Inc., Itasca, Ill.
Filed Aug. 7, 1987, Ser. No. 82,693
Term of patent 14 years
U.S. Cl. D14—114

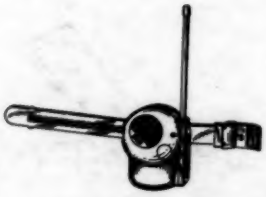
310,521
COMBINED DRAWING TABLET AND CURSOR CONTROL FOR COMPUTER
Donny Leung, Tai Koo Sing, Hong Kong, assignor to Video Technology Industries, Inc., Palatine, Ill.
Filed Apr. 15, 1988, Ser. No. 182,312
Claims priority, application United Kingdom, Oct. 28, 1987, 1,045,905
Term of patent 14 years
U.S. Cl. D14—114



310,522
COMBINED TELEVISION RECEIVER AND VIDEO CASSETTE RECORDER
Doo S. Yang, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 5, 1988, Ser. No. 254,290
Claims priority, application Rep. of Korea, Apr. 11, 1988, 4967/1988[U]
Term of patent 14 years
U.S. Cl. D14—129

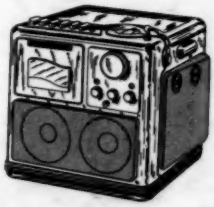


310,523
TRANSCEIVER
Ichiro Hino, Yokohama, and Toshihisa Yokoi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Dec. 27, 1988, Ser. No. 289,769
Claims priority, application Japan, Aug. 15, 1988, 63-32536
Term of patent 14 years
U.S. Cl. D14—137



310,524
TELEPHONE STATION SET
Toshiyuki Utsuki, Tahikawa; Nobuo Fukuda, Machida; Yoshihiro Kwakatsu, Sayama, and Yasunari Ichara, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Jul. 12, 1989, Ser. No. 378,610
Claims priority, application Japan, Feb. 17, 1989, 1-5611
Term of patent 14 years
U.S. Cl. D14—151

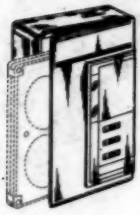
310,525
COMBINED RADIO AND CASSETTE RECORDER
Murray I. C. Camens, Singapore, Singapore, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jun. 9, 1988, Ser. No. 206,157
Claims priority, application United Kingdom, Dec. 22, 1987, 1.047.290
Term of patent 14 years
U.S. Cl. D14—162

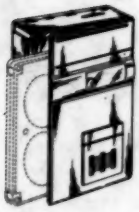


310,526
COMBINED TAPE PLAYER AND TUNER
Hideki Tsuboi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Mar. 7, 1988, Ser. No. 165,131
Claims priority, application Japan, Sep. 10, 1987, 62-36762
Term of patent 14 years
U.S. Cl. D14—163

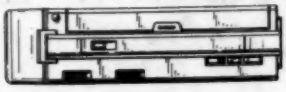
310,527
COMBINED TAPE PLAYER AND TUNER
Kazuharu Yamamoto, and Reiko Koshimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Apr. 26, 1988, Ser. No. 186,204
Claims priority, application Japan, Oct. 27, 1987, 62-43628
Term of patent 14 years
U.S. Cl. D14—163

310,528
COMBINED TAPE PLAYER AND TUNER
Kazuharu Yamamoto, and Reiko Koshimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Apr. 26, 1988, Ser. No. 186,209
Claims priority, application Japan, Oct. 27, 1987, 62-43627
Term of patent 14 years
U.S. Cl. D14—163



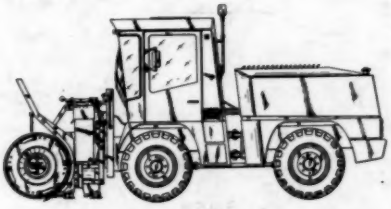


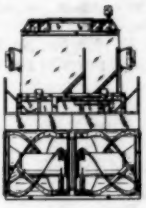
310,529
COMBINED AM/FM RADIO, CASSETTE PLAYER, SPOTLIGHT AND TOOL BOX
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Jul. 28, 1988, Ser. No. 225,146
Claims priority, application United Kingdom, Feb. 2, 1988, 1048181
Term of patent 14 years
U.S. Cl. D14—168

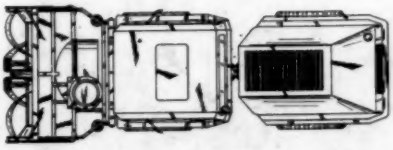


310,530
NON-ELECTRONIC SOUND AMPLIFIER
Rex McGuire, 2108 Rodeo Dr., Mountain Home, Ark. 72653
Filed Sep. 21, 1988, Ser. No. 247,070
Term of patent 14 years
U.S. Cl. D14—205

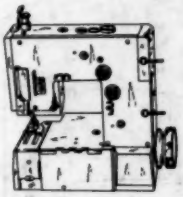
310,531
SNOW-CUTTING MACHINE
Louis L. LePoix, Baden-Baden, assignor to Ing. Alfred Schmidt GmbH, St. Blasien, Fed. Rep. of Germany
Filed Dec. 23, 1987, Ser. No. 137,135
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, AZ 2 REG686/87
Term of patent 14 years
U.S. Cl. D15—11



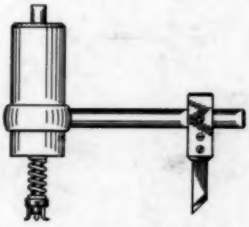




310,532
INDUSTRIAL SEWING MACHINE
Toyokichi Gotou, Souka, Japan, assignor to Newlong Machine Works, Ltd., Tokyo, Japan
Filed Jul. 17, 1986, Ser. No. 886,775
Claims priority, application Japan, May 25, 1986, 61-10510
The portion of the term of this patent subsequent to Jul. 3, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D15—69

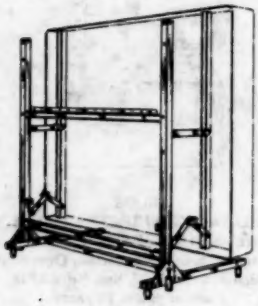


310,533
SPECIALIZED CIRCLE CUTTER
Robert L. Garrett, 46301 Twp. Rd. 1171, and Gregory A. Lauvray, 335 Sycamore, both of Coshocton, Ohio 43812
Filed Jun. 19, 1987, Ser. No. 63,848
Term of patent 14 years
U.S. Cl. D15—139



310,534
PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE
James M. Ryan, New York; Enrique Alie, Brooklyn, both of N.Y., and David C. Stowers, Nutley, N.J., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Nov. 23, 1987, Ser. No. 123,989
Term of patent 14 years
U.S. Cl. D16—214

310,535
SCREEN STAND
William H. Barrett, Woodstock; Joseph A. Gregory, Kingston; Lisa M. Mohr, and David L. Schaum, both of Woodstock, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 3, 1986, Ser. No. 926,474
Term of patent 14 years
U.S. Cl. D16—241

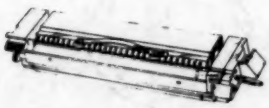


310,536
COMBINED PHOTOGRAPHIC PRINTER AND FILM PROCESSOR
Monte D. Lavine, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 6, 1987, Ser. No. 12,901
Term of patent 14 years
U.S. Cl. D16—246

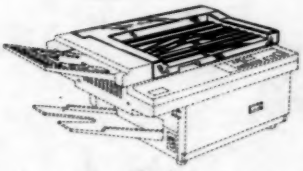
310,537
SNARE DRUM LUG CASING
Mitsuo Yanagisawa, Chiba, Japan, assignor to Pearl Musical Instrument Co., Chiba, Japan
Filed Apr. 22, 1988, Ser. No. 184,706
Term of patent 14 years
U.S. Cl. D17—22

310,538
BASS DRUM LUG CASING
Mitsuo Yanagisawa, Chiba, Japan, assignor to Pearl Musical Instrument Co., Chiba, Japan
Filed Apr. 22, 1988, Ser. No. 184,707
Term of patent 14 years
U.S. Cl. D17—22

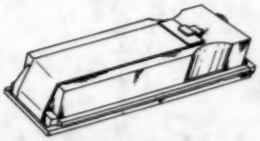
310,539
DEVELOPING DEVICE FOR COPYING MACHINE
Takeshi Komada, Yokohama, and Yutaka Okayama, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 19, 1988, Ser. No. 221,179
Claims priority, application Japan, Jan. 22, 1988, 63-2205
Term of patent 14 years
U.S. Cl. D18—40



310,540
DOCUMENT FEEDER FOR A COPY MACHINE
Toshikazu Matsui, Osaka; Shigetoshi Ishikawa, Hyogo, and Yoshinari Itoi, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan
Filed Aug. 2, 1988, Ser. No. 227,268
Claims priority, application Japan, Mar. 11, 1988, 63-10066
Term of patent 14 years
U.S. Cl. D18—42



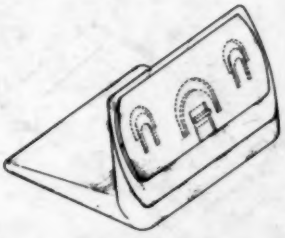
310,541
TONER CARTRIDGE FOR A COPYING MACHINE
Yoshitake Miyoshi, Ikoma, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan
Filed Jan. 13, 1988, Ser. No. 143,552
Claims priority, application Japan, Aug. 27, 1987, 62-35019
Term of patent 14 years
U.S. Cl. D18—43



310,542
WRITING INSTRUMENT
Pierre Regnault, Valence, France, assignor to Etablissements Regnault, Valence, France
Filed May 28, 1987, Ser. No. 55,113
Claims priority, application France, Nov. 28, 1986, 86 6327
Term of patent 14 years
U.S. Cl. D19—43

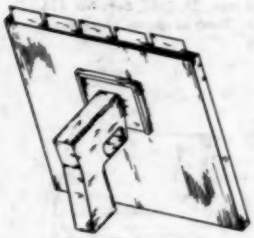
310,543
ELECTRONIC ADDRESS BOOK
Toran S. Brown, Carmichael, Calif., assignor to The McGregor Company, Santa Monica, Calif.
Filed Nov. 23, 1987, Ser. No. 124,757
Term of patent 14 years
U.S. Cl. D19—76

310,544
BASE FOR A FILE ASSEMBLY
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Jan. 16, 1987, Ser. No. 4,022
Term of patent 14 years
U.S. Cl. D19—99

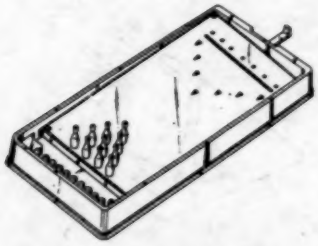


310,545
SALE SIGN
Naftali Avittan, 431 Malden, Richardson, Tex. 75080
Filed Sep. 21, 1987, Ser. No. 98,669
Term of patent 14 years
U.S. Cl. D20—10

310,546
HAND-HELD MESSAGE SIGN
David Peltz, 5766 N. Bel Aire Dr., Glendale, Wis. 53209
Filed Feb. 19, 1988, Ser. No. 158,161
Term of patent 14 years
U.S. Cl. D20—10



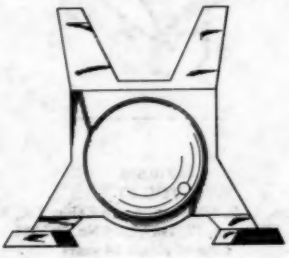
310,547
BOWLING GAME BOARD
Erland Wikner, Tranas, Sweden, assignor to Stiga Aktiebolag, Tranas, Sweden
Filed Jul. 20, 1988, Ser. No. 225,133
Claims priority, application Sweden, Feb. 3, 1988, 88-0229
Term of patent 14 years
U.S. Cl. D21—11



310,548
AERIAL TOY
Stephen Weiss, 570 S. Shore Dr., Miami Beach, Fla. 33141
Filed Oct. 27, 1988, Ser. No. 263,601
Term of patent 14 years
U.S. Cl. D21—86

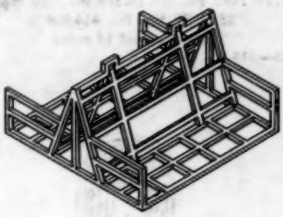
310,549
DOLL
Amy J. Rogers, Gilbert, Ariz., assignor to Julie L. Davis, Las Vegas, Nev., a part interest
Filed Dec. 12, 1988, Ser. No. 283,879
Term of patent 14 years
U.S. Cl. D21—157

310,550
HOUSING FOR EXERCISE CYCLE OR SIMILAR ARTICLE
Roger P. Fry, Llantwit Major, United Kingdom, assignor to Gympac Systems Limited, Barry, United Kingdom
Filed Mar. 15, 1988, Ser. No. 168,331
Claims priority, application United Kingdom, Sep. 19, 1987, 1045001
Term of patent 14 years
U.S. Cl. D21—194

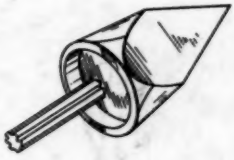


310,551
GOLF PUTTER HEAD
Scott W. West; Leslie C. Streeter, and Gregory S. Halter, all of Coos Bay, Oreg., assignors to The House of Myrtlewood, Inc., Coos Bay, Oreg.
Filed Sep. 14, 1987, Ser. No. 95,656
Term of patent 14 years
U.S. Cl. D21—219

310,552
DOUBLE BACK SWING SEAT
Larry D. Campbell, Rte. 3, Box 296C, Tecumseh, Okla. 74873
Filed Apr. 27, 1987, Ser. No. 43,236
Term of patent 14 years
U.S. Cl. D21—246



310,553
ARROWHEAD
Bruce Kania, 77 S. 14th St., Bozeman, Mont. 59715, and William Walker, 3141 Swetzer, Loomis, Calif. 95650
Filed Nov. 29, 1988, Ser. No. 277,921
Term of patent 14 years
U.S. Cl. D22—115

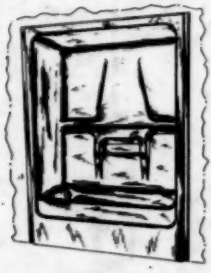


310,554
FISHHOOK DISGORGER
Randy Smith, Box 131, Rena Lava, Miss. 38767
Filed Oct. 13, 1987, Ser. No. 108,028
Term of patent 14 years
U.S. Cl. D22—149

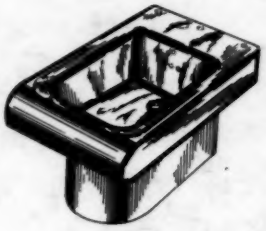
310,555
COMBINED REVERSIBLE SPRINKLER NOZZLE AND SUPPORT RING
Robert W. Hengsbach, 7886 Munson Rd., Mentor, Ohio 44060
Division of Ser. No. 234,249, Jul. 26, 1988, which is a continuation of Ser. No. 20,684, Mar. 2, 1987, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, Pat. No. D. 293,127, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. D. 282,392, which is a division of Ser. No. 756,186, Jul. 18, 1985, Pat. No. D. 284,301. This application Sep. 28, 1989, Ser. No. 414,069
Term of patent 14 years
U.S. Cl. D23—213

310,556
FLEXIBLE HOSE CLAMP COVER
David L. Russell, Manhattan Beach, Calif., assignor to Russell Industries, Inc., Paramount, Calif.
Filed Jun. 8, 1987, Ser. No. 59,274
Term of patent 14 years
U.S. Cl. D23—265

310,557
BATHING ENCLOSURE OR THE LIKE
Iain M. Smith, Vernon, Canada, assignor to Kohler LTD/LTEE., Toronto, Canada
Filed Oct. 26, 1987, Ser. No. 112,127
Term of patent 14 years
U.S. Cl. D23—275



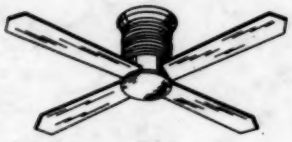
310,558
BIDET
Herbert V. Kohler, Jr., Kohler, and Mary J. Reid, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1988, Ser. No. 144,438
Term of patent 14 years
U.S. Cl. D23—295



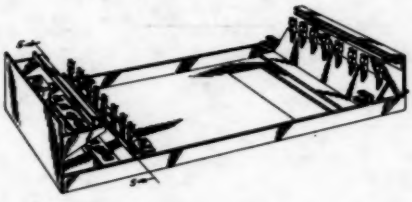
310,559
TOILET
Mark W. Cors, Lodi, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 17, 1989, Ser. No. 297,918
Term of patent 14 years
U.S. Cl. D23—295

310,560
TANK OR THE LIKE
Henry M. Stairs, Jr., Neshanic, N.J., assignor to American Standard Inc., New York, N.Y.
Filed Dec. 1, 1987, Ser. No. 128,535
Term of patent 14 years
U.S. Cl. D23—313

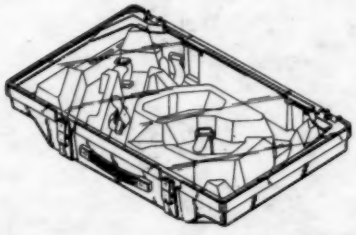
310,561
CEILING FAN
Thomas H. Janicz, Ardmore, Pa., assignor to Casablanca Fan Company, Inc., City of Industry, Calif.
Filed Oct. 28, 1988, Ser. No. 264,494
Term of patent 14 years
U.S. Cl. D23—377



310,562
HOUSING FOR MOUNTING A PLURALITY OF INFRARED HEATING LAMPS
Jürgen Socha, Västerås, Sweden, assignor to Itronic Process AB, Uddevalla, Sweden
Filed Aug. 5, 1986, Ser. No. 893,346
Claims priority, application Sweden, Feb. 6, 1986, 860311
Term of patent 14 years
U.S. Cl. D23—386



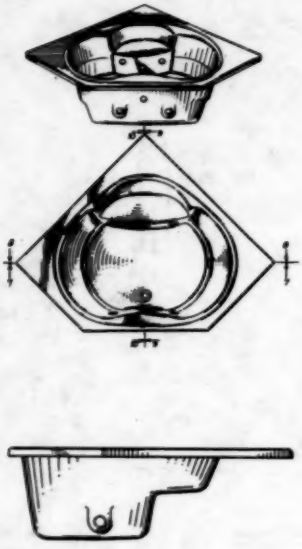
310,563
STORAGE CASE FOR MEDICAL INSTRUMENT
Stuart M. Greengrass, 56 Kimberley Road, Little Wakering, Essex; Philip M. Coath, 9 Canute Close, Canewdon, Essex; Russell Manoy, 4 The Green, Welwyn, Hertfordshire; David Muston, Old Pond Barn, Lower Weald, Calverton, and Andrew Scagell, Flat D, 74 Cophall Gardens, Twickenham, Middlesex, all of United Kingdom
Filed Jul. 22, 1986, Ser. No. 888,193
Term of patent 14 years
U.S. Cl. D24—9



310,564
PILL CRUSHER
Bradley M. Besaw, 10701 Cull Canyon Rd., Castro Valley, Calif. 94546
Filed Feb. 8, 1988, Ser. No. 153,646
Term of patent 14 years
U.S. Cl. D24—23

310,565
NASAL DILATOR
Björn Petruson, Santessonsgatan 1, S-412 66 Göteborg, Sweden
Filed May 19, 1988, Ser. No. 196,085
Claims priority, application United Kingdom, Nov. 19, 1987, 1046459
Term of patent 14 years
U.S. Cl. D24—34

310,566
WHIRLPOOL BATHTUB
Remo C. Jacuzzi, Little Rock, Ark., assignor to Jason International, Inc., Little Rock, Ark.
Filed Aug. 10, 1987, Ser. No. 83,088
Term of patent 14 years
U.S. Cl. D24—38



310,567
TRAINER SPOUT TO BE USED IN CONJUNCTION WITH A BABY BOTTLE
William E. Fitzpatrick, Wyckoff, N.J., assignor to Playtex Family Products, Inc., Stamford, Conn.
Filed Apr. 26, 1988, Ser. No. 186,273
Term of patent 14 years
U.S. Cl. D24—47

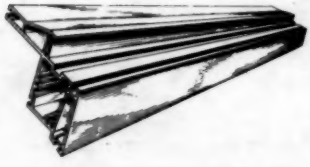
310,568
BABY BOTTLE
Paul L. Chapin, 1783 Haight St., San Francisco, Calif. 94117
Filed May 8, 1989, Ser. No. 349,137
Term of patent 14 years
U.S. Cl. D24—47

310,569
CANNULA FOR WITHDRAWING A TEST SAMPLE FROM A TEST TUBE
Bengt-Inge Brodén, Gårdfarivägen 3, S-532 00 Skara, Sweden
Filed Aug. 10, 1987, Ser. No. 83,988
Claims priority, application Sweden, Feb. 9, 1987, 87-0272
Term of patent 14 years
U.S. Cl. D24—51

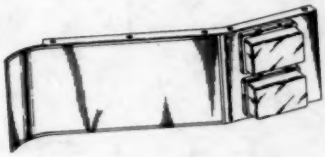
310,570
PORTABLE INTRAVENOUS POLE
James A. Wells, 2401 Miriam, Arlington, Tex. 76010
Filed Feb. 8, 1988, Ser. No. 153,650
Term of patent 14 years
U.S. Cl. D24—51

310,571
SIDELINE SHELTER
Frank M. Liposky, 402 Birch, Champaign, Ill. 61820
Filed Dec. 18, 1987, Ser. No. 134,900
Term of patent 14 years
U.S. Cl. D25—1

310,572
WINDOW COMPONENT EXTRUSION
Ludwig Reisinger, McPherson; Dennis Westphal, Galva, and Jonathan Piles, McPherson, all of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 1, 1987, Ser. No. 91,704
The portion of the term of this patent subsequent to Mar. 21, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—119



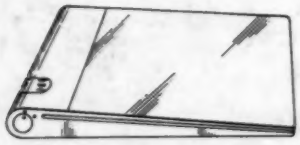
310,573
AUXILIARY TURN SIGNAL FOR VEHICLES
Howard Lubin, 10012 Nevada Ave., Chatsworth, Calif. 91311
Filed Apr. 2, 1987, Ser. No. 33,502
Term of patent 14 years
U.S. Cl. D26—35



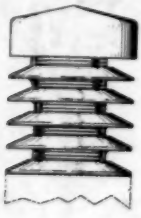
310,574
PORTABLE LAMP
Burton Trattner, Ringwood, N.J., assignor to Harvey-Westbury Corp., Westbury, N.Y.
Filed Sep. 21, 1987, Ser. No. 98,667
Term of patent 14 years
U.S. Cl. D26—44

310,575
FLASHLIGHT FOR USE BY PHYSICIANS FOR MOUTH, EAR, AND THE LIKE
Nobret Leopoldi, Chicago, and William Heinrich, McHenry, both of Ill., assignors to The Cloverline, Inc., Chicago, Ill.
Filed Jun. 10, 1987, Ser. No. 60,375
Term of patent 14 years
U.S. Cl. D26—47

310,576
ILLUMINATED MAP HOLDER
Theresa M. Narbut, 269 W. Camino Real, Arcadia, Calif. 91006, and Andres E. Ramirez, 551 Meadow Grove, Flintridge, Calif. 91011
Filed Jan. 15, 1988, Ser. No. 144,079
Term of patent 14 years
U.S. Cl. D26—58

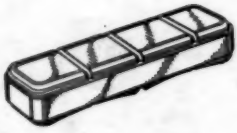


310,577
POST LIGHT FIXTURE
Jay J. Kakuk, Plymouth; Joseph J. Walto, Carver, and Steven T. O'Brien, Champlin, all of Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed Mar. 10, 1988, Ser. No. 166,843
Term of patent 14 years
U.S. Cl. D26—67



310,578
CIGARETTE PACKAGE HOLDER
Mikhail Vaynshteyn, 250 Ashley Dr., Rochester, N.Y. 14620
Filed Feb. 1, 1988, Ser. No. 150,707
Term of patent 14 years
U.S. Cl. D27—187

310,579
TRISCORED DRUG TABLET
Phillip F. Ni, Mattawan, and Larry F. Odar, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.
Continuation of Ser. No. 133,992, Dec. 17, 1987, abandoned.
This application Apr. 28, 1989, Ser. No. 345,428
Term of patent 14 years
U.S. Cl. D28—2

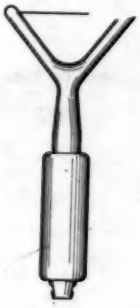


310,580
DISPOSABLE RAZOR/TWEEZER
Victor S. King, 7920 San Felipe Blvd., #2507, Austin, Tex. 78729
Filed Oct. 9, 1987, Ser. No. 106,321
Term of patent 14 years
U.S. Cl. D28—46

310,581
NAIL FILE
Charlton Sadler, P.O. Box 446, Brooksville, Fla. 33512
Filed Oct. 18, 1989, Ser. No. 423,139
Term of patent 14 years
U.S. Cl. D28—59

310,582
DENTAL FLOSS HOLDER
Osamu Kajirai, Kumagaya, Japan, assignor to G-C Dental Industrial Corporation, Tokyo, Japan
Filed Sep. 7, 1988, Ser. No. 241,399
Claims priority, application Japan, Mar. 8, 1988, 63-9147
Term of patent 14 years
U.S. Cl. D28—64

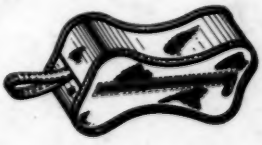
310,583
DENTAL FLOSS HOLDER
William J. Pickett, P.O. Box 827, Walnut Grove, Calif. 95690
Filed Aug. 21, 1989, Ser. No. 396,017
Term of patent 14 years
U.S. Cl. D28—64



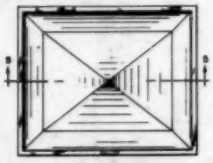
310,584
LIGHTED TELESCOPIC MIRROR
Emmanuel Cadet, 335-A Beaver Rd., Lagrangeville, N.Y. 12540
Filed Jul. 7, 1988, Ser. No. 216,241
Term of patent 14 years
U.S. Cl. D28—64.1

310,585
PROTECTIVE CAP FOR A RESPIRATOR'S REPLACEABLE FILTER
William E. Newcomb, Coventry, R.I., assignor to Siebe North, Inc., Charleston, S.C.
Filed Apr. 29, 1987, Ser. No. 43,988
Term of patent 14 years
U.S. Cl. D29—7

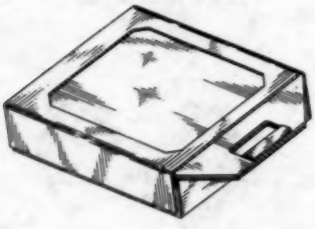
310,586
PET CARRYING CASE
Howard Dobelle, New City, N.Y., assignor to Andoe Inc., New City, N.Y.
Filed Jan. 28, 1988, Ser. No. 150,566
Term of patent 14 years
U.S. Cl. D30—109



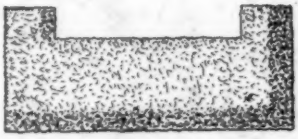
310,587
CAT LITTER BOX
Robert Hinson, 27251 Comba, Mission Viejo, Calif. 92692
Filed Mar. 8, 1985, Ser. No. 709,814
Term of patent 14 years
U.S. Cl. D30—161



310,588
DISPOSABLE CAT LITTER BOX
Tina M. Valinsky, 7152 Rock Ridge Ter., West Hills, Calif. 91307
Filed Nov. 28, 1988, Ser. No. 276,568
Term of patent 14 years
U.S. Cl. D30—161



310,589
FLEXIBLE COVER FOR A SPONGE MOP
Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North Brunswick, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.
Filed Apr. 14, 1988, Ser. No. 181,621
Term of patent 14 years
U.S. Cl. D32—40

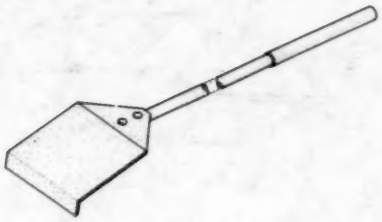


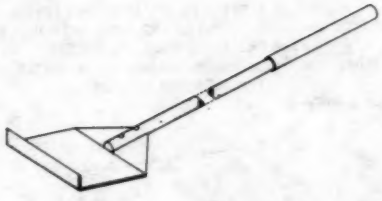
310,590

GUTTER CLEANING TOOL

John T. Williams, Jr., 3240 Burning Tree Dr., Birmingham, Ala. 35226

Filed Mar. 16, 1988, Ser. No. 168,752
Term of patent 14 years
U.S. Cl. D32—49



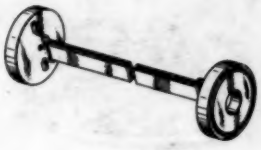


310,591

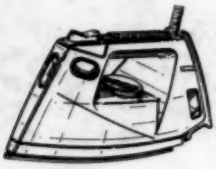
LINE-TYPE HOLDER WITH A MAGNETIC SUPPORT UNIT FOR SUPPORTING ARTICLES

Stanley E. Jeffus, 202 Hockaday, Garland, Tex. 75043

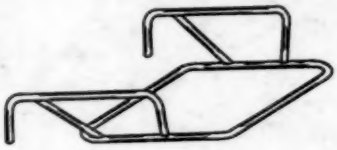
Filed Jul. 21, 1986, Ser. No. 887,650
Term of patent 14 years
U.S. Cl. D32—60



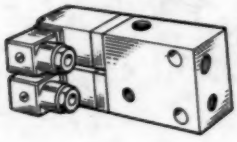
310,592
IRON
Michael N. Komar, Shropshire, England, assignor to Russell Hobbs Tower Ltd., Wombourne, United Kingdom
Filed Aug. 5, 1988, Ser. No. 229,104
Claims priority, application United Kingdom, Feb. 5, 1988, 1048308
Term of patent 14 years
U.S. Cl. D32—70



310,593
CARRIER RACK FOR HOUSING A COOLER WHEN ATTACHED TO A GOLF CART
Joseph R. Lamarche, 562 Kintail Street, Sarnia, Ontario, Canada N7T 1Z1
Filed Jan. 5, 1987, Ser. No. 972
Claims priority, application Canada, Jul. 4, 1986, 04-07-86-6
Term of patent 14 years
U.S. Cl. D34—27



310,594
VENTURI UNIT FOR A VACUUM LIFTER
Karl E. Johansson, Nykyrkevägen 52, S-565 00 Mullsjö, Sweden
Filed Oct. 1, 1987, Ser. No. 103,567
Claims priority, application Sweden, Apr. 1, 1987, 87-0741
Term of patent 14 years
U.S. Cl. D34—28



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TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See*—
White, Dorothy C.; and Niekamp, Carl W., 4,955,364, Cl. 127-63.000.

A. H. Robins Company, Inc.: *See*—
Taylor, Chandler R., Jr.; Cale, Albert D., Jr.; and Stauffer, Harold F., Jr., 4,956,359, Cl. 514-210.000.

A. Stephan u. Soehne GmbH & Co.: *See*—
Otto, Friedrich, 4,955,724, Cl. 366-314.000.

Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., to International Business Machines Corporation. Real time data transformation and transmission overlapping device. 4,956,808, Cl. 364-900.000.

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Lindstrom, Vincent, 4,955,248, Cl. 74-424.500.

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Chu, Daniel T.; and Rosen, Terry J., 4,956,473, Cl. 548-557.000.
Gordon, Julian; and Pugh, Charles S. G., 4,956,302, Cl. 436-161.000.
Grandone, Cass J., 4,956,148, Cl. 422-64.000.

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Abe, Masanori; Mase, Syunzo; and Kozuka, Yoshinari, to NGK Insulators, Ltd. Method and apparatus for optically measuring electric current and/or magnetic field. 4,956,607, Cl. 324-244.000.

Abe, Nobuyuki: *See*—
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Abe, Taizo, to Okamura Corporation. Foldable table. 4,955,294, Cl. 108-6.000.

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Abiru, Toichi: *See*—
Miyasaka, Tadashi; Matsuda, Akira; Abiru, Toichi; and Machida, Haruhiko, 4,956,345, Cl. 514-46.000.

Abis, Luigi: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

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Lienard, Jean; Haesebrouck, Francis; Katz, Sol; Abolins, Andrew; and Schmidt, George, 4,955,144, Cl. 105-4.200.

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Baskin, David, 4,956,030, Cl. 156-61.000.

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Defosse, Georges; Bonhomme, Henri; and Lesceux, Rene, 4,956,738, Cl. 361-8.000.

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Hamada, Masataka; Ishida, Tokuji; and Adaka, Yasuaki, 4,956,659, Cl. 354-400.000.

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Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., 4,956,441, Cl. 528-171.000.

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Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.
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Richer, Mark S.; Adeyeye, Aderemi A.; and Helgert, Hermann, 4,956,709, Cl. 358-147.000.

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Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Beck, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, 4,955,993, Cl. 55-16.000.

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Oka, Kunihiko; and Unoki, Hiromi, 4,956,334, Cl. 505-1.000.
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Aiello, Bruno, to AMP Incorporated. Method of operating harness making machine. 4,955,927, Cl. 29-861.000.

Aimoto, Toyoka: *See*—
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Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 4,956,417, Cl. 525-327.700.

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Robeson, Lloyd M.; and Langsam, Michael, 4,956,095, Cl. 210-670.000.
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Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, 4,956,657, Cl. 354-195.120.

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Al-Malaika, Sahar: *See—*
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Alasafi, Khaldoun: *See—*
Schiessle, Edmund; and Alasafi, Khaldoun, 4,955,241, Cl. 73-862.690.

Alb. Klein GmbH & Co. KG: *See—*
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Albrecht, Ernst: *See—*
Kolb, Wolfgang; and Albrecht, Ernst, 4,955,307, Cl. 112-304.000.

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Albright, Larry W. Plasma Display using a double-walled enclosure. 4,956,579, Cl. 315-58.000.

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Kross, Robert D., 4,956,184, Cl. 424-661.000.

Alcon Laboratories, Inc.: *See—*
Herman, Wesley K., 4,955,894, Cl. 606-167.000.

Alcorn, Gary W.: *See—*
Reinert, Karl A.; and Alcorn, Gary W., 4,955,251, Cl. 74-501.50R.

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Henry, Wayne M., 4,956,150, Cl. 422-102.000.

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D'Angelo, Domenico; and Visconti, Marco, 4,955,329, Cl. 123-52.0MF.

Alfano, Robert R.; and Ho, Ping P. Ultrafast oscilloscope. 4,956,548, Cl. 250-213.0VT.

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Hayn, Holger V.; and Rausch, Juergen, 4,955,674, Cl. 303-114.000.

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Hahn, Paul; and Allan, James, 4,956,032, Cl. 156-94.000.

Allen, Donald R., to Frazier Industrial Company. Storage rack system. 4,955,489, Cl. 211-151.000.

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Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, to ATEQ Corporation. Pattern generation system. 4,956,650, Cl. 346-108.000.

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Allergan, Inc.: *See—*
Van Gent, Stanley L., 4,955,889, Cl. 606-107.000.

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Chao, Tai-Hsiang; Schoonover, Michael W.; and Stranford, Gerald T., 4,956,329, Cl. 502-251.000.
Hasegawa, Ryusuke, 4,956,743, Cl. 361-45.000.
Knight, David J.; Kubik, James M.; and Neal, Brian P., 4,955,994, Cl. 55-163.000.

Allsing, Karl J. Method for operating rotating cylindrical filters and a rotatable cylindrical filter. 4,956,102, Cl. 210-784.000.

Almes, Horst-Dieter; and Grutza, Bernd, to Transnorm System GmbH. Belt conveyor with belt reinforcing member. 4,955,466, Cl. 198-831.000.

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Akiyama, Keiichi, 4,956,677, Cl. 355-303.000.
Onozato, Takashi, 4,956,652, Cl. 346-139.00R.

Alton, Forrest W. Display device. 4,955,485, Cl. 211-14.000.

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Misra, Chanakya, 4,956,172, Cl. 424-54.000.
Nguyen, Quyen C.; and Hittner, Herman J., 4,956,158, Cl. 423-111.000.

Aluminum Company of America ALCOA Laboratories: *See—*
Rolles, Rolf; and Humphries, Darral V., 4,956,140, Cl. 264-280.000.

Alza Corporation: *See—*
Eckenhoff, James B., 4,955,881, Cl. 604-890.100.

Amataka, Atsushi; Kushida, Kazumitsu; Nakajima, Koji; and Yamamoto, Hitoshi, to Honda Giken Kogyo Kabushiki Kaisha. Piston for internal combustion engine. 4,955,353, Cl. 123-668.000.

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Parrish, William J., 4,956,602, Cl. 324-158.00R.

Amemiya, Masahiro: *See—*
Soeyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, 4,956,220, Cl. 428-141.000.

Amenex Associates, Inc.: *See—*
Hitchings, Jay R., 4,955,427, Cl. 164-358.000.

Amerace Corporation: *See—*
Luzzi, Glenn J., 4,955,823, Cl. 439-507.000.

American Cyanamid Company: *See—*
Hinman, Lois M.; and Miller, Libby S., 4,956,467, Cl. 548-112.000.
Kozakiewicz, Joseph J.; and Huang, Sun-Yi, 4,956,399, Cl. 523-223.000.
Kozakiewicz, Joseph J.; and Dauplaise, David L., 4,956,400, Cl. 523-223.000.
Tamura, Susan Y.; and Asato, Goro, 4,956,479, Cl. 549-264.000.

American Home Products Corp.: *See—*
Novinski, Michael V.; and Patton, Thomas J., 4,955,481, Cl. 206-534.000.

American Hydro Corporation: *See—*
Chacour, Selim A.; and Colwill, William H., 4,955,789, Cl. 415-201.000.

American Monarch Corporation: *See—*
Heavey, Frederick D.; and Engleman, Rudolph, 4,956,597, Cl. 320-14.000.

American Standarad Inc.: *See—*
Hansen, William G., 4,955,210, Cl. 62-511.000.

American Standard Inc.: *See—*
Basile, Peter A.; Madan, Ashvani K.; Snyder, Fred E.; and Stillman, Harold M., 4,955,921, Cl. 4-354.000.

American Sterilizer Company: *See—*
Cummings, Arthur L.; and Childers, Robert W., 4,956,145, Cl. 422-28.000.

Ammermann, Eberhard: *See—*
Wenderoth, Bernd; Brand, Siegbert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.

Amoco Corporation: *See—*
Akhavan-Leilabady, Pedram; and Anthon, Douglas W., 4,956,843, Cl. 372-23.000.
Lautzenhiser, Theodore V.; and Eisner, Melvin, 4,955,232, Cl. 73-382.00G.
Leduc, Edward C., 4,956,395, Cl. 521-79.000.
Williams, David E.; and Kelly, Michael C., 4,955,952, Cl. 181-111.000.

AMP Incorporated: *See—*
Aiello, Bruno, 4,955,927, Cl. 29-861.000.

Anand, Joginder N.: *See—*
Ruetman, Sven H.; and Anand, Joginder N., 4,956,438, Cl. 528-60.000.

Anasazi, Inc.: *See—*
Biffle, L. Leslie; and Larson, Chad R., 4,956,805, Cl. 364-900.000.

Anderson, Carl. Pump jack. 4,955,584, Cl. 182-133.000.

Anderson, Michael D., to Zinpro Corporation. Copper complexes with alpha hydroxy organic acids and their use as nutritional supplements. 4,956,188, Cl. 426-74.000.

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Hoppe, Richard J.; Jackson, Steven E.; and Anderson, William K., 4,956,696, Cl. 357-79.000.

Ando, Shigeyuki: *See—*
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.

Andoh, Kazuto: *See—*
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.

Andries, Koenraad J. L. M.: *See—*
Mesens, Jean L.; and Andries, Koenraad J. L. M., 4,956,351, Cl. 514-58.000.

Angelone, James D. Fuel containment module. 4,955,494, Cl. 220-587.000.

Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, to Mobil Oil Corporation. Catalytic cracking. 4,956,075, Cl. 208-120.000.

Animalens, Inc.: *See—*
Wise, Randall E.; and Leighton, Alvah T., Jr., 4,955,711, Cl. 351-160.00R.

Anklam, William J.: *See—*
Su, Chung-Yi; Ty Tan, Michael R.; and Anklam, William J., 4,956,568, Cl. 307-352.000.

Annen, Klaus: *See—*
Hofmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,956,482, Cl. 552-594.000.

Ansaldi, Gwenaele; Gil, Gerard; and Le Petit, Jean, to Societe Nationale Elf Aquitaine. Process for obtaining natural vanilla flavor by treatment of green vanilla beans, and the flavor obtained. 4,956,192, Cl. 426-425.000.

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Akhavan-Leilabady, Pedram; and Anthon, Douglas W., 4,956,843, Cl. 372-23.000.

Antibody Technology Limited: *See—*
Self, Colin H., 4,956,303, Cl. 436-542.000.

Antoniello, Frank, to I.W. Industries. Connector for water pipes. 4,955,406, Cl. 137-318.000.

Aoki, Kei: *See—*
Suzuki, Yuji; Urano, Satoshi; Umemoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.

Aoki, Mitsuo: *See*—
Watanabe, Yoichiro; Isoda, Tetsuo; and Aoki, Mitsuo, 4,956,258, Cl. 430-109.000.
Aoki, Takashi: *See*—
Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kitsutaka, Eiji, 4,955,257, Cl. 74-866.000.
Aoki, Takayuki: *See*—
Saeki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, 4,956,027, Cl. 148-257.000.
Aoki, Yuichi: *See*—
Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shiraishi, Yasunori, 4,956,227, Cl. 428-331.000.
Aono, Tetsuya; Suno, Masahiro; and Kito, Go, to Takeda Chemical Industries, Ltd. Thiazolo (5,4-B)azepine compounds. 4,956,360, Cl. 514-215.000.
Aoyama, Masaaki: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujimoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
Appel, Jean, to Office National d'Etudes et de Recherche Aerospatiales (ONERA). Method and apparatus for processing digitized images. 4,956,874, Cl. 382-56.000.
Apple Computer, Inc.: *See*—
Gruenberg, Eric, 4,955,828, Cl. 439-668.000.
Aqua-Aerobic Systems, Inc.: *See*—
Mikkleson, Kenneth A., 4,956,100, Cl. 210-717.600.
Arai, Fuminori: *See*—
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.
Arai, Katsumi: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.
Arai, Kazuo; and Ota, Kiyoshi, to Matsushita Electric Industrial Co., Ltd. Apparatus having a high-speed search capability for reproducing signals recorded on a tape. 4,956,730, Cl. 360-70.000.
Arai, Ryuichi; Sakaki, Mamoru; and Matsui, Shinya, to Canon Kabushiki Kaisha. Recording medium and recording method utilizing the same. 4,956,223, Cl. 428-212.000.
Arai, Yoshimitsu: *See*—
Yamasshi, Shunji; and Arai, Yoshimitsu, 4,955,255, Cl. 74-856.000.
Arakawa, Eric: *See*—
Skedeleski, David; and Arakawa, Eric, 4,955,314, Cl. 114-219.000.
Archambault, Roger J.: *See*—
McCarthy, Francis T.; and Archambault, Roger J., 4,955,475, Cl. 206-346.000.
Archibald, John P.: *See*—
Shekleton, Jack R.; and Archibald, John P., 4,955,201, Cl. 60-738.000.
Ardell, George G.; Geck, Reginald W.; Jenkins, John M., III; and Sheard, William G., to Union Carbide Chemicals and Plastics Company Inc. Process for controlled polymerization of stereospecific alpha-olefins having preselected isotacticity. 4,956,426, Cl. 526-60.000.
Arimatsu, Yoshikazu: *See*—
Mitamura, Hideyuki; and Arimatsu, Yoshikazu, 4,956,431, Cl. 526-257.000.
Arita, Kinya: *See*—
Tsutsui, Osamu; Haraga, Hisato; Arita, Kinya; Makita, Atsuo; Takeuchi, Hirofumi; and Tsukada, Ryoichi, 4,955,535, Cl. 236-12.120.
Arlt, Klaus; Dirking, Theodora; Josten, Karl H.; and Streitberger, Hans J., to BASF Lacke & Farben AKT. Process for removing from electrocoating baths impurities which cause surface defects. 4,956,096, Cl. 210-692.000.
Armbrust, William D., to Kennametal Inc. Tool assembly with a hydraulic chip-breaking fluid system. 4,955,264, Cl. 82-158.000.
Armenta, Richard D.: *See*—
Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, 4,956,275, Cl. 435-7.000.
Armington, Alton F.: *See*—
Harris, Meckie T.; Larkin, John J.; Armington, Alton F.; and Kennedy, John K., 4,956,047, Cl. 156-623.00Q.
Armstrong World Industries, Inc.: *See*—
Barrall, Jeffery L., 4,956,321, Cl. 501-146.000.
Tymon, Thomas M.; and Turbak, Albin F., 4,956,121, Cl. 252-378.00R.
Arndt, Jurgen, to Telefunken Electronic GmbH. Process for fabricating an integrated circuit. 4,956,305, Cl. 437-31.000.
Arnold, Kenneth A.; Chang, Wunan; and Robinson, Kelly S., to Eastman Kodak Company. Developer mix monitoring for replaceable developer stations. 4,956,668, Cl. 355-208.000.
Arrowsmith, John E.; Cross, Peter E.; Dickinson, Roger P.; and Thomas, Geoffrey N., to Pfizer Inc. Sulfonamide anti-arrhythmic agents. 4,956,382, Cl. 514-443.000.
Arzenti, Thomas E.: *See*—
Metals, Michael J.; Clark, William G., Jr.; Junker, Warren R.; Burtner, Lee W.; Arzenti, Thomas E.; Johnson, Harold P.; Vestovich, Robert P.; and Bevilacqua, Bruce W., 4,955,235, Cl. 73-601.000.
Arzoian, John; Shih, Shan; and Trachman, Edward G., to Rockwell International Corporation. Transmission and method of operation. 4,955,851, Cl. 475-59.000.
Asada, Seiichi: *See*—
Sueyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, 4,956,220, Cl. 428-141.000.
Asahi Denka Kogyo Kabushiki Kaisha: *See*—
Suzuki, Kazuaki; Maruzeni, Shoji; Nakai, Eiji; and Nezu, Toru, 4,956,287, Cl. 435-134.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
Asai Germanium Research Institute Co., Ltd.: *See*—
Kakimoto, Norihiro; Kumano, Kazuo; and Nakamura, Kunie, 4,956,272, Cl. 435-1.000.
Asakura, Masahiro; and Igawa, Akihiko, to Kurabe Industrial Co., Ltd. Positive temperature coefficient semiconductor ceramic. 4,956,320, Cl. 501-137.000.
Asakura, Osamu: *See*—
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masazumi, 4,955,738, Cl. 400-229.000.
Asakura, Tsutou: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,956,714, Cl. 358-213.110.
Asano, Kazuo: *See*—
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,956,670, Cl. 355-210.000.
Asano, Kuniji: *See*—
Tsuchihashi, Toshio; Wakahara, Yasushi; and Asano, Kuniji, 4,956,790, Cl. 364-513.000.
Asano, Masami: *See*—
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, 4,955,525, Cl. 228-183.000.
Asanuma, Masato; Kaneshige, Masatoshi; and Aimoto, Toyoka, to Sharp Kabushiki Kaisha. Developing device. 4,955,316, Cl. 118-657.000.
Asaoka, Teruo: *See*—
Kuwabara, Yohei; Asaoka, Teruo; Yoshioka, Shogo; and Sugiyama, Haruki, 4,956,060, Cl. 204-129.200.
Asato, Goro: *See*—
Tamura, Susan Y.; and Asato, Goro, 4,956,479, Cl. 549-264.000.
Asbery, Ray. Sheathed cutting means apparatus and method. 4,955,124, Cl. 29-426.400.
Asea Brown Boveri Aktiengesellschaft: *See*—
Kamuf, Alfred; and Dorrscheidt, Wolfgang, 4,956,246, Cl. 429-104.000.
Asea Brown Boveri Ltd.: *See*—
Stucki, Samuel; and Winkler, Dieter, 4,956,057, Cl. 204-101.000.
Ashby, Chris A.: *See*—
Dougherty Patrick F.; and Ashby, Chris A., 4,955,608, Cl. 273-29.00A.
Ashimori Kogyo Kabushiki Kaisha: *See*—
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.
Ashizawa, Masaaki; Nishimoto, Kazuo; and Saito, Hiroshi, to Nichias Corporation. Rubber-coated gasket. 4,956,226, Cl. 428-323.000.
Ashworth Bros., Inc.: *See*—
Straight, Michael R.; and Raum, Jack R., 4,955,465, Cl. 198-778.000.
Asics Corporation: *See*—
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 4,956,783, Cl. 364-468.000.
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.
Aso, Hiroaki; and Kitamura, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Rotating electric machine. 4,955,944, Cl. 123-41.310.
Asperger, Robert G.: *See*—
Thompson, Neil E. S.; and Asperger, Robert G., 4,956,099, Cl. 210-764.000.
Astra Lakemedel Aktiebolag: *See*—
Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjoberg, Berndt O. H., 4,956,179, Cl. 424-114.000.
Astra Pharmaceutical Products, Inc.: *See*—
Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjoberg, Berndt O. H., 4,956,179, Cl. 424-114.000.
Astra-Vent AB: *See*—
Torok, Vilmos; and Loreth, Andrezej, 4,955,991, Cl. 55-120.000.
Astro Aerospace Corp.: *See*—
Marks, Geoff, 4,955,742, Cl. 403-246.000.
AT&T Bell Laboratories: *See*—
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 4,955,688, Cl. 350-96.290.
Freeman, Lucius J.; and Gagen, Paul F., 4,955,976, Cl. 350-96.210.
Swaminathan, Kumar, 4,956,871, Cl. 381-31.000.
Atebara, Neal; and Miller, David, to Beth Israel Hospital Association, The. Masked intraocular lens and method for treating a patient with cataracts. 4,955,904, Cl. 623-6.000.
ATEQ Corporation: *See*—
Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, 4,956,650, Cl. 346-108.000.

Atochem: *See*—
Commandeur, Raymond; and Gurtner, Bernard, 4,956,120, Cl. 252-364.000.

Atochem North America, Inc.: *See*—
Sanchez, Jose, 4,956,416, Cl. 525-327.600.

Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, to Kabushiki Kaisha Toshiba. Non-volatile semiconductor memory having improved testing circuitry. 4,956,816, Cl. 365-201.000.

Aubrey, Truman R.; and Gerke, Steven R., to Janice Industries. Lamp mounting apparatus and method. 4,956,758, Cl. 362-285.000.

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White, Donald A.; Auda, Richard S.; Davis, William M.; and Ferrughelli, David T., 4,956,420, Cl. 525-351.000.

Auriol, Daniel H.; Paul, Francois B.; and Monsan, Pierre F., to Bio-europe. Water-soluble L-tyrosine derivatives and a process for preparing L-tyrosine derivatives. 4,956,489, Cl. 560-40.000.

Ausonia S.p.A.: *See*—
Clerici, Piero R.; and Casalegno, Italo, 4,956,228, Cl. 428-336.000.

Austin, Wayne R.: *See*—
Carsciolo, Anthony, Jr.; Austin, Wayne R.; Zuccaro, Dante C.; and Ponsrelu, Leonard P., 4,955,655, Cl. 294-93.000.

Avon Industrial Polymers Limited: *See*—
West, John P., 4,955,589, Cl. 267-140.100.

Awano, Katsuya: *See*—
Kojima, Eisuke; Fujimori, Shizuyoshi; and Awano, Katsuya, 4,956,372, Cl. 514-311.000.

Awata, Muneaki: *See*—
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, 4,955,189, Cl. 57-207.000.

Awbrey, Spencer S., to Betz Laboratories, Inc. Method of scavenging hydrogen halides from liquid hydrocarbonaceous mediums. 4,956,076, Cl. 208-291.000.

Ayub, Abdul L.; and Schwarz, Herbert F., to Polysar Limited. Nitrile rubber/vinyl chloride polymer/silica compositions. 4,956,398, Cl. 523-209.000.

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Stanislawczyk, Vic, 4,956,434, Cl. 526-318.200.

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Ippen, Joachim; Baasner, Bernd; Marhold, Albrecht; Kysela, Ernst; Schaller, Klaus; and von Bittera, Miklos, 4,956,370, Cl. 514-275.000.

Baba, Masao: *See*—
Ueoka, Masatoshi; Matsumoto, Syoichi; Yoshida, Hiroshi; and Baba, Masao, 4,956,493, Cl. 560-208.000.

Babcock Display Products, Inc.: *See*—
Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., 4,956,573, Cl. 313-15.000.

Babu, Suryadevara V.; Lu, Neng-Hsing; and Jones, Gerald W., to International Business Machines Corporation. Plasma conditioning of a substrate for electroless plating. 4,956,197, Cl. 427-39.000.

Back, Henry N.: *See*—
Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickola, William E.; Kim, Peter K.; and Admassu, Wudneh, 4,955,993, Cl. 55-16.000.

Backofen, Joseph E.: *See*—
Petrousky, James A.; Backofen, Joseph E.; and Butz, Donald J., 4,955,939, Cl. 102-476.000.

Bacon, Chester A., Jr., to Minnesota Mining and Manufacturing Company. Thin caliper retroreflective transfer. 4,955,690, Cl. 350-105.000.

Badylak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., to Purdue Research Foundation. Tissue graft composition. 4,956,178, Cl. 424-551.000.

Bahlmann, Johannes P. M., to U.S. Philips Corp. Output circuit with drive current limitation. 4,956,565, Cl. 307-254.000.

Baier & Koppel GmbH & Co, Prazisionsapparate: *See*—
Skarupa, Gunter, 4,955,792, Cl. 417-399.000.

Bailey, Alan; and Yew, David K., to British Nuclear Fuels plc. Apparatus for transporting objects. 4,956,079, Cl. 209-552.000.

Bailey, Thomas F.; and Todd, Raymond A., Jr., to Drilex Systems, Inc. Mud saver valve with increased flow check valve. 4,955,949, Cl. 137-71.000.

Bailey, Webb L.: *See*—
Schweighardt, Frank K.; and Bailey, Webb L., 4,956,390, Cl. 514-747.000.

Baird, Andrew; Bohlen, Peter; Gospodarowicz, Denis; and Ling, Nicholas C., to Salk Institute for Biological Studies, The. Bovine fibroblast growth factor. 4,956,455, Cl. 530-399.000.

Baker, Geoffrey; Pearce, Roger; and Williamson, Paul L., to U.S. Philips Corp. Pyroelectric infra-red detectors and their method of manufacture. 4,956,554, Cl. 250-338.300.

Baker Industries, Inc.: *See*—
Vogt, William R., 4,956,637, Cl. 340-644.000.

Baker, Jeffrey H., to M-D, Inc. Surgical chair or table with debris-catching facility and disposable catch bag therefor. 4,955,666, Cl. 297-182.000.

Baker, John E.: *See*—
Heckaman, Douglas E.; Baker, John E.; and Whybrew, Walter M., 4,956,621, Cl. 333-104.000.

Baldwin, William C., to North American Dynamics. Ammunition transfer apparatus. 4,955,280, Cl. 89-33.040.

Balling, Curtis. Hydraulic apparatus for installing piping below ground. 4,955,757, Cl. 405-184.000.

Balloni, Ricardo; Donovan, Kevin M.; and Keung, Jay K., to Mobil Oil Corporation. Multi-layer heat-sealable polypropylene films. 4,956,232, Cl. 428-349.000.

Balmer, Keith, to Texas Instruments, Incorporated. Digital electronic system. 4,956,850, Cl. 375-3.000.

Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjoberg, Berndt O. H., to Astra Lakemedel Aktiebolag; and Astra Pharmaceutical Products, Inc. Antibacterial combination of penicillin and cephalosporin. 4,956,179, Cl. 424-114.000.

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Smith, Donald W., 4,955,754, Cl. 404-108.000.

Barber, Harold P.; Lee, Clyde; and Ruckman, Paul J. Method and apparatus for seismic exploration. 4,956,822, Cl. 367-23.000.

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Baril, Michel, to Thomson-CSF. Device including a radial combiner for electromagnetic waves. 4,956,614, Cl. 330-286.000.

Barker, George W.; Crumpler, Michael G.; Peters, James W.; and Hughey, Delmar R., to Southwire Company. Method and apparatus for automatically adjusting soluble oil flow rates to control metallurgical properties of continuously rolled rod. 4,955,216, Cl. 72-10.000.

Barlow, James L. Incinerator grate assembly. 4,955,296, Cl. 110-300.000.

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Erekson, Erek J.; Lee, Anthony L.; Barone, S. Peter; and Solomon, Irvine J., 4,956,327, Cl. 502-216.000.

Barrall, Jeffery L., to Armstrong World Industries, Inc. Surface pacified wollastonite. 4,956,321, Cl. 501-146.000.

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Barry, Michael, to Neihold, Daniel A. Mounting structure for arcuate window frames. 4,955,168, Cl. 52-210.000.

Barsoum, James G., to Biogen, Inc. Method for producing cells containing stably integrated foreign DNA at a high copy number, the cells produced by this method, and the use of these cells to produce the polypeptides coded for by the foreign DNA. 4,956,288, Cl. 435-172.300.

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Stern, Donald J.; Heaton, Jeff S.; Tryon, James A.; and Bartholmey, Brett A., 4,955,545, Cl. 239-320.000.

Bartos, Jeffrey B.: *See*—
Cockrum, Charles A.; Barton, Jeffrey B.; and Schulte, Eric F., 4,956,304, Cl. 437-5.000.

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Degner, Dieter; Gramlich, Walter; and Schuster, Ludwig, 4,956,341, Cl. 512-23.000.
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.
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Kranz, Joachim; and Wiesenberger, Alois, 4,956,018, Cl. 106-401.000.
Muehlenbernd, Thomas; and Hasenbein, Norbert, 4,956,414, Cl. 525-196.000.
Wenderoth, Bernd; Brand, Siegbert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.

BASF K & F Corp.: *See*—
Christenson, Philip A.; and Drake, Brian J., 4,956,342, Cl. 512-24.000.

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Arlt, Klaus; Dirking, Theodora; Josten, Karl H.; and Streitberger, Hans J., 4,956,096, Cl. 210-692.000.

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Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 4,956,402, Cl. 523-415.000.
Basile, Peter A.; Madan, Ashvani K.; Snyder, Fred E.; and Stillman, Harold M., to American Standard Inc. Flushing mechanism using phase change fluid. 4,955,921, Cl. 4-354.000.
Baskin, David, to Academy of Applied Science. Method of fabricating simulated stone surfaces and improved simulated stone products. 4,956,030, Cl. 156-61.000.
Batishko, Charles R.; Kirihara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., to Battelle Memorial Institute. System for measuring film thickness. 4,956,558, Cl. 250-461.100.
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Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
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Baumann, Hans D. Weirless diaphragm valve. 4,955,582, Cl. 251-58.000.
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Bausch, Paul, to General Motors Corporation. Differential gear unit for motor vehicle drive axles. 4,955,853, Cl. 475-241.000.
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Diehr, Hans-Joachim; and Becker, Benedikt, 4,956,356, Cl. 514-341.000.
Ippen, Joachim; Baasner, Bernd; Marhold, Albrecht; Kysela, Ernst; Schaller, Klaus; and von Bittera, Miklos, 4,956,370, Cl. 514-275.000.
Leitz, Edgar; Buysch, Hans-Josef; Bottenbruch, Ludwig; and Ott, Karl-Heinz, 4,956,485, Cl. 556-446.000.
Mais, Franz-Josef; Fiege, Helmut; and Henneke, Karl-Wilhelm, 4,956,505, Cl. 568-316.000.
Reichert, Gunther, 4,956,160, Cl. 423-231.000.
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Williams, John L.; Dederichs, Reinhold; Schlak, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.
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Bayer, Gerald W.; Diamantopoulos, Paul A.; Osterhoudt, Hans W.; and Schmit, Paul F., to Eastman Kodak. Nitrate therapy for angina pectoris. 4,956,181, Cl. 424-448.000.
Bayless, John D., Jr.: *See*—
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Beals, David C., to Administrator, National Aeronautics and Space Administration. Spiral lead platen robotic end effector. 4,955,653, Cl. 294-119.100.
Beatty, Paul: *See*—
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Beaty, Dennis W.; and Shafer, C. Brooks, to Frito-Lay, Inc. Method and apparatus for automatically detecting the presence of holes in filled and sealed packed plastic bags. 4,955,226, Cl. 73-49.300.
Beaty, Keith D.: *See*—
Lazzara, Richard J.; and Beaty, Keith D., 4,955,811, Cl. 433-173.000.
Beck, Charles E. J.: *See*—
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.
Beck, Lee R., to Stolle Research & Development Corporation. Anti-inflammatory factor, method of isolation, and use. 4,956,349, Cl. 514-54.000.
Becker, Benedikt: *See*—
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Mount, Bruce E.; and Becker, Douglas P., 4,955,946, Cl. 128-719.000.
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Becker, Michael; and Renz, Klaus, to Siemens Aktiengesellschaft. Device for locating internal faults in a high-voltage capacitor battery. 4,956,739, Cl. 361-16.000.
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Bedair, Salah M.: *See*—
Reeber, Robert R.; Chu, Wei-Kan; and Bedair, Salah M., 4,956,000, Cl. 65-18.100.
Beer, Dieter; Reddehase, Horst; Kerbstat, Siegfried; Hanning, Detlef; Plass, Ulrich; and Krause, Hermann, to C. A. Weidmuller GmbH & Co. Multiple signal transmission device. 4,956,747, Cl. 361-392.000.
Beer, Jeffrey S.; and Gracie, Michael D., Sr., to Fres-co System USA, Inc. Package with peelable portion for light sensitive materials. 4,955,479, Cl. 206-455.000.
Behm, Dale H.; Eberle, Theodore F.; and Powers, Thomas F., to Hoover Universal, Inc. Plastic bottle with reinforcing ring encircling the bottle base. 4,955,492, Cl. 215-12.100.
Behm, Dale H.: *See*—
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Behr, Hans; Vetter, Kurt; Schneider, Rolf; and Luderer, Fred, to Behr Industrieanlagen GmbH & Co. Apparatus for coating workpieces electrostatically. 4,955,960, Cl. 239-3.000.
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Behr, Hans; Vetter, Kurt; Schneider, Rolf; and Luderer, Fred, 4,955,960, Cl. 239-3.000.
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Behrens, Mark B., to INA Bearing Company. Unitary, axially self-locating needle bearing. 4,955,732, Cl. 384-484.000.
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Bellows, Alfred H.: *See*—
Buhrer, Carl F.; Carlsen, W. John; Cousins, Sarah S.; and Bellows, Alfred H., 4,955,686, Cl. 350-96.200.
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, to BASF Aktiengesellschaft. Preparation of dihydroquinacridones, quinacridones and quinacridonequinones. 4,956,464, Cl. 546-37.000.
Bendix Limited: *See*—
Knight, David J.; Kubik, James M.; and Neal, Brian P., 4,955,994, Cl. 55-163.000.
Benedict, Charles E.; and Stumpf, Donald M., to Benedict Engineering Co. Inc. Headlight, windshield wiper control system. 4,956,562, Cl. 307-10.800.
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Benedict, Charles E.; and Stumpf, Donald M., 4,956,562, Cl. 307-10.800.
Bengtson, Dale F., to Motorola, Inc. Digital pattern decoder. 4,956,854, Cl. 375-111.000.
Bennett, Kurt K., to Weatherchem Corporation. Dispensing closure with flap retention. 4,955,513, Cl. 222-480.000.
Benz, Erwin; Rau, Wolfgang; Bauer, Rainer; and Willy, Gerd, to Daimler-Benz Aktiengesellschaft. Closed hollow support. 4,955,570, Cl. 248-300.000.
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., to Bristol-Myers Company. Direct compression cholestyramine tablet and solvent-free coating therefor. 4,956,182, Cl. 424-476.000.
Berard, Paul M., to Siemens Transmission Systems, Inc. Frequency multiplier. 4,956,797, Cl. 364-703.000.
Berchem, Rutger, to Metalpraecis Berchem + Schaberg Gesellschaft fur Metallformgebung mit beschrankter Haftung. Joint prosthesis. 4,955,912, Cl. 623-18.000.
Berghout, Cornelis W.; and Van Haren, Hendrikus J. J. M., to U.S. Philips Corporation. Multilayer capacitor. 4,956,744, Cl. 361-321.000.
Berman, Arnold L.: *See*—
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Bernard, William B.; and Minteer, William B., to Com-Ser Laboratories, Inc. Emergency radio alerting and message transmitting system directable to selected classes and numbers of receivers. 4,956,875, Cl. 455-13.000.

Bernardini, Allen J., to Litton Systems, Inc. Method for controlling connector insertion or extraction sequence on power distribution panel. 4,955,821, Cl. 439-133.000.

Bernheim, Michael; Strasilla, Dieter; De Sousa, Bernardo; and Rohringer, Peter, to Ciba-Geigy Corporation. Process for sizing paper with anionic hydrophobic sizing agents and cationic retention aids. 4,956,049, Cl. 162-158.000.

Bernstein, Bernard; and Sohie, Guy L., to Sy/Lert System Ltd. Emergency signal warning system. 4,956,866, Cl. 381-43.000.

Bersch, Friedrich. Apparatus for cleaning pipelines for beverages and the like. 4,955,100, Cl. 15-3.510.

Bersonnet, George; and Dalebout, William T., to Proform Fitness Products, Inc. Exercise cycle with gear drive. 4,955,599, Cl. 272-73.000.

Bertiller, Roland; and Maier, Roland, to Mauser-Werke Oberndorf GmbH. Adaptive cartridge for a subcaliber barrel system. 4,955,300, Cl. 102-446.000.

Bertola, Mauro A.: *See—*
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Bertoldo, Franco, to Sperotto Rimar S.p.A. Apparatus for causing the shrinking of a cloth. 4,955,114, Cl. 26-18.600.

Bertolini, Carlo, to Rockwell-CIM. Connecting device between a window and a window-raiser arm in a vehicle door. 4,955,161, Cl. 49-351.000.

Beta Raven Inc.: *See—*
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Beth Israel Hospital Association, The: *See—*
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Betz Laboratories, Inc.: *See—*
Awbrey, Spencer S., 4,956,076, Cl. 208-291.000.

Betz PaperChem, Inc.: *See—*
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Beukers, John M.: *See—*
Miller, Edward J.; Beukers, John M.; and Friedman, Maurice, 4,956,646, Cl. 343-706.000.

Beutler, Hans: *See—*
Bayer, deceased; Karl; and Beutler, Hans, 4,955,098, Cl. 14-16.100.

Bevilacqua, Bruce W.: *See—*
Metala, Michael J.; Clark, William G., Jr.; Junker, Warren R.; Burtner, Lee W.; Arzenti, Thomas E.; Johnson, Harold P.; Vestovich, Robert P.; and Bevilacqua, Bruce W., 4,955,235, Cl. 73-601.000.

Bezinque, David J.; and Jacques, James O., to Seagate Technology, Inc. Disc memory servo indexing system. 4,956,727, Cl. 360-49.000.

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Bicehouse, Jack L.: *See—*
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Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., to International Business Machines Corporation. Tab mounted chip burn-in apparatus. 4,956,605, Cl. 324-158.00F.

Bieker, Guido: *See—*
Kramer, Rolf; Lohmann, Alfred; Bieker, Guido; and Budenbender, Herbert, 4,955,293, Cl. 105-199.300.

Biermann, Theodore F.: *See—*
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Biffle, L. Leslie; and Larson, Chad R., to Anasazi, Inc.; and International Anasazi, Inc. Circuitry for character translate functions. 4,956,805, Cl. 364-900.000.

Big Creek Sports Ltd.: *See—*
Kaschper, Jurgen R., 4,955,839, Cl. 440-101.000.

Bigelis, Ramunas; and Black, Kathleen A., to Miles Inc. Biotransformation of L-tyrosine and L-phenylalanine to 2,5-dihydroxyphenylacetic acid. 4,956,279, Cl. 435-42.000.

Billman, Elizabeth R.: *See—*
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Bilodeau, Marcel J.; Dube, Andre ; and Quesnel, Andre-Paul, to Produits Carmine Inc. Polymer concrete conveyor roller. 4,955,462, Cl. 193-37.000.

Bin, Valter, to Vabin International S.r.L. Disposable safety syringe with a hypodermic needle. 4,955,869, Cl. 604-195.000.

Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., to Glitsch, Inc. Downcomer-tray assembly and method. 4,956,127, Cl. 261-114.100.

Bio Clinic Corporation: *See—*
Gilroy, Keith; Limon, Gary T.; and Buchicchio, David F., 4,955,096, Cl. 5-464.000.

BioCarb AB: *See—*
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Bioeurope: *See—*
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Biofield Corporation: *See—*
Faupel, Mark L., 4,955,383, Cl. 128-653.00R.

Biogen, Inc.: *See—*
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Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.

Bioplasty, Inc.: *See—*
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BioResearch, Inc.: *See—*
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Biospherics Incorporated: *See—*
Levin, Gilbert V.; and Wright, Ronald R., 4,956,094, Cl. 210-625.000.

Biotechnology, Inc.: *See—*
See, Jackie R.; and Shell, William E., 4,955,878, Cl. 604-181.000.

Biotox Pty. Ltd.: *See—*
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Bisping, Bernhard: *See—*
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Bjorn, Michael J.; Frankel, Arthur E.; Laird, Walter J.; Ring, David B.; and Winkelhake, Jeffrey L., to Cetus Corporation. Anti-human ovarian cancer immunotoxins and methods of use thereof. 4,956,453, Cl. 530-389.000.

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Blackman, Stephen M.; and Neale, Douglas L., to Federal Paper Board Co., Inc. Clamshell style carton. 4,955,527, Cl. 229-114.000.

Blackmer, Richard H.; and Hedman, Jonathan W., to Transpirator Technologies, Inc. Method and apparatus for pulmonary and cardiovascular conditioning of racehorses and competition animals. 4,955,372, Cl. 128-203.160.

Blake, William S. Trigger actuated pump and method of making same. 4,955,511, Cl. 222-321.000.

Blanchard, Richard A.; and Williams, Richard K., to Siliconix Incorporated. Integrated circuit with high power, vertical output transistor capability. 4,956,700, Cl. 357-23.400.

Blazek, William S., to PCC Airfoils, Inc. Method of making a turbine engine component. 4,955,423, Cl. 164-35.000.

Blecha, William E.; and Kent, Henry J., to International Paper Company. On-line fiber orientation distribution measurement. 4,955,720, Cl. 356-429.000.

Bledsoe, Brett O.: *See—*
Bledsoe, Gary R.; and Bledsoe, Brett O., 4,955,369, Cl. 128-80.00C.

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Blem, Allen R.: *See—*
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Blocker, Wesley C.: *See—*
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Blum, Holger. Method for concentrating/dehydrating of sewage sludge. 4,956,092, Cl. 210-609.000.

Boardwick, Kathleen E.: *See—*
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Boatwright, Darrell L., to PAR Microsystems Corp. Automatic bypass system for ring type local area network. 4,956,836, Cl. 370-16.100.

Bobba, Mohan L., to Spectra-Physics, Inc. Laser scanner having improved optical scanning window. 4,955,693, Cl. 350-319.000.

Boden, Richard M.: *See—*
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.

Boehringer Biochemia Robin S.p.A.: *See—*
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Boehringer Mannheim Corporation: *See—*
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Boeing Company, The: *See—*
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Coleman, Jeffrey O., 4,956,834, Cl. 370-1.000.
Sankrithi, Mithra M. K. V.; and Pelton, Scott L., 4,956,780, Cl. 364-428.000.

Boge AG: *See—*
Reuter, Horst; Quast, Jorn-Rainer; and Schall, Roland, 4,955,588, Cl. 267-140.100.

Bogsch, Erika: *See—*
Kreidl, Janos; Turcsanyi, Peter; Stefko, Bela; Meszaros nee Brill, Judit; and Bogsch, Erika, 4,956,007, Cl. 71-103.000.

Bohlen, Peter: *See—*
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Bohman, Carl E., to Ford New Holland, Inc. Underground electromagnetic tillage depth sensor. 4,955,437, Cl. 172-1.000.

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Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.00F.

Bolanos, Henry; Piszko, John; and Williams, David M., to Gruner + Jahr Printing and Publishing Co. Boat toy and method for making same. 4,955,843, Cl. 446-160.000.

Boldesigns, Inc.: *See*—
Bollinger, Howard E., 4,955,146, Cl. 34-191.000.

Bolesky, Richard C., to Boehringer Mannheim Corporation. Fixation system for an elongated prosthesis. 4,955,910, Cl. 623-13.000.

Bolich, Donald L. Bag holding system. 4,955,566, Cl. 248-101.000.

Bollinger, Howard E., to Boldesigns, Inc. Lumber drying kiln. 4,955,146, Cl. 34-191.000.

Bollinger, Pietro; Gubler, Hans U.; and Schnyder, Jorg, to Sandoz Ltd. Treating tissue calcium depletion or degenerative processes in bone or cartilage. 4,956,381, Cl. 514-443.000.

Bona, Alfredo D.; and Airaghi, Attilio, to Murray Europe S.p.A. Connection for fluids. 4,955,643, Cl. 285-190.000.

Bonelli, Fabio: *See*—
Verdini, Antonio S.; Bonelli, Fabio; and Pesai, Antonello, 4,956,449, Cl. 530-324.000.

Bonenberger, Bruce A.: *See*—
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Bonhomme, Henri: *See*—
Defosse, Georges; Bonhomme, Henri; and Lesceux, Rene, 4,956,738, Cl. 361-8.000.

Bonilla, Jorge A.: *See*—
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.

Bonne, Ulrich; and James, Steven D., to Honeywell Inc. Method and apparatus for measuring the density of fluids. 4,956,793, Cl. 364-558.000.

Bonomi, Giovanni B.; and Oldani, Battistino, to Imta. Multi-task end effector for robotic machining center. 4,955,119, Cl. 29-50.000.

Boomer, John: *See*—
Burgher, Peter H.; Holmes, Richard L.; and Boomer, John, 4,956,745, Cl. 361-383.000.

Boot Lake Industries, Inc.: *See*—
Merkel, Gordon, 4,955,533, Cl. 232-39.000.

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Chawan, Dhyaneshwar B.; Merritt, Carleton G.; and Ibrahim, Radwan H., 4,956,190, Cl. 426-269.000.
Streiff, Paul J.; Hoyda, David L.; and Epstein, Edward, 4,956,186, Cl. 426-43.000.

Borgonovi, Girgio: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

Borrello, Sebastian R.; and Roberts, Charles G., to Texas Instruments Incorporated. Two color infrared focal plane array. 4,956,686, Cl. 357-30.000.

Bos, Louis. Shoe, sandal or similar footwear. 4,955,147, Cl. 36-11.500.

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Fusco, Raffaello; Piselli, Fulvio L.; and Boschi, Pier M., 4,956,460, Cl. 544-234.000.

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Moore, Daniel S., 4,955,575, Cl. 248-398.000.

Bott, John A. Cargo restraint system. 4,955,771, Cl. 410-94.000.

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Leitz, Edgar; Buysch, Hans-Josef; Bottenbruch, Ludwig; and Ott, Karl-Heinz, 4,956,485, Cl. 556-446.000.

Botti, Edoardo, to Jacobacci-Casetta & Perani. Muting circuit for audio amplifiers. 4,956,616, Cl. 330-297.000.

Bourassa, Roger J., to Boeing Company, The. Low temperature plasma generator with minimal RF emissions. 4,956,582, Cl. 315-111.210.

Bousquet, Michele: *See*—
Le Fur, Gerard; Bousquet, Michele; Crisafulli, Emilio; and Sabadie, Michel, 4,956,173, Cl. 424-63.000.

Boutin-Lester, Paige L. Z. Lettuce and vegetable cutting device. 4,955,271, Cl. 83-404.300.

Bowlds, Daniel P., to MPD, Inc. Mechanical adjustment arrangement for dielectric resonator oscillator. 4,956,617, Cl. 331-96.000.

Boyd, Jack D.; Sitt, Hermann; Ryang, Hong-Son; and Biermann, Theodore F., to BASF Aktiengesellschaft. Structures exhibiting improved transmission of ultrahigh frequency electromagnetic radiation and structural materials which allow their construction. 4,956,393, Cl. 521-54.000.

Boydens, Roland: *See*—
Cousement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, 4,956,367, Cl. 514-236.200.

Boyer, Keith: *See*—
Rhodes, Charles K.; Boyer, Keith; Solem, Johndale C.; and Haddad, Waleed S., 4,955,974, Cl. 350-3.670.

Boyer, Michael R.: *See*—
Dillon, David M.; Boyer, Michael R.; and Foster, James E., 4,955,291, Cl. 104-299.000.

Bozek, John W. Archery device with constrained four-bar linkage. 4,955,354, Cl. 124-23.100.

BP Chemicals Limited: *See*—
O'Connor, Sean P., 4,956,118, Cl. 544-240.000.

Branco, Anthony G.: *See*—
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.

Brand, Siegbert: *See*—
Wenderoth, Bernd; Brand, Siegbert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.

Brandener, Louis, to Dubois, Jacques. Method of manufacturing a high temperature composite gasket including a strip segment of non-woven fibrous refractory material. 4,955,218, Cl. 72-146.000.

Bratovz, Matjaz, to Elfriede Rossler. Model railroad track having a track bed. 4,955,537, Cl. 238-10.00B.

Braun, Hilarion, to Eastman Kodak Company. Bubble jet print head having improved multi-layer protective structure for heater elements. 4,956,653, Cl. 346-140.00R.

Braunisch, Eckart; and Onnegren, Jan, to U.S. Philips Corporation. Microwave oven with adaptable power module. 4,956,531, Cl. 219-10.55B.

Brendel, Bernhard; Kubik, Klaus; and Kusters, Karl-Heinz, to Eduard Kusters Maschinenfabrik GmbH & Co. KG. Hydrostatically supported roll. 4,955,120, Cl. 29-113.200.

Brennan, Richard, Sr., to KimRick, Inc. Lifting and positioning device for cabinets and construction panels. 4,955,592, Cl. 269-68.000.

Brewster, Steven L.: *See*—
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,956,235, Cl. 428-368.000.

Bricker, Cedric L.; Pease, Timothy K.; and Kammeyer, Donald L., to Pease Windamatic Systems, Inc. Feeder blade replacement apparatus for coil inserter tooling. 4,955,130, Cl. 29-734.000.

Bricker, Jeffery C.: *See*—
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., 4,956,324, Cl. 502-163.000.

Bridgestone Corporation: *See*—
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, 4,956,247, Cl. 429-194.000.

Briggs, Eugene C.; and Cooperrider, Myron T., to Robert Sun Company. Furnace with counterflow heat exchange means. 4,955,359, Cl. 126-110.00R.

Briggs, Jonathan: *See*—
Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, 4,956,275, Cl. 435-7.000.

Brighton, Rich W.; and Safr, Paul. Small caliber ammo conversion kit. 4,955,157, Cl. 42-77.000.

Bristol Compressors, Inc.: *See*—
Terwilliger, Gerald L., 4,955,796, Cl. 417-547.000.

Bristol-Myers Company: *See*—
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., 4,956,182, Cl. 424-476.000.
Cipollina, Joseph A.; and Ruediger, Edward H., 4,956,368, Cl. 514-254.000.
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.

Bristol-Myers Squibb Company: *See*—
Meanwell, Nicholas A., 4,956,376, Cl. 514-381.000.
Meanwell, Nicholas A., 4,956,379, Cl. 514-406.000.

British Aerospace Public Limited Company: *See*—
Machell, Anthony; and Foulsham, Peter G., 4,955,558, Cl. 244-3.220.

British-American Tobacco Company Limited: *See*—
Milner, John K.; and Dagnall, Roger B., 4,955,398, Cl. 131-280.000.

British Nuclear Fuels plc: *See*—
Bailey, Alan; and Yew, David K., 4,956,079, Cl. 209-552.000.

Brochot, Jean: *See*—
Siddiqi, Iqbal; and Brochot, Jean, 4,956,276, Cl. 435-12.000.

Brock, George W., to Eastman Kodak Company. Magnetic head contour utilizing facets for air film skiving. 4,956,737, Cl. 360-122.000.

Brockman, Milton H. Receiver for communications satellite down-link reception. 4,956,864, Cl. 380-34.000.

Bronstein, Irena Y.; and Edwards, Brooks, to Tropix, Inc. Synthesis of 1,2-dioxetanes. 4,956,477, Cl. 549-221.000.

Brooks, Harvey L.; and Cathey, Tommy W. Pipe tapering device. 4,955,165, Cl. 51-331.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.
Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, 4,956,662, Cl. 355-27.000.
Sakuragi, Shoji, 4,955,735, Cl. 400-83.000.
Ukon, Tsutomu, 4,955,733, Cl. 400-17.000.

Brothers, Paul: *See*—
Coggins, Peter R.; Mitchell, Andrew L.; Brothers, Paul; and Muir, William L., 4,955,906, Cl. 623-8.000.

Brouwer, Geert, to U.S. Philips Corporation. X-ray line detector device and X-ray analysis apparatus comprising such a device. 4,956,855, Cl. 378-45.000.

Brown, Colin R.: *See*—
Martell, William A.; and Brown, Colin R., 4,955,804, Cl. 425-548.000.

Brown, David B.; and Gonze, Eugene V., to General Motors Corporation. Multi-fuel engine control with fuel composition responsive fuel viscosity correction. 4,955,345, Cl. 123-381.000.

Brown & Williamson Tobacco Corporation: *See*—
Johnson, Robert R.; and Tang, Jiunn-Yann, 4,955,397, Cl. 131-194.000.

Brucker, Robert J., to Seal Spout Corporation. Bird feeder. 4,955,319, Cl. 119-52.200.

Brugere, Robert; Faure, Robert; Galmard, Yves; and Gereaton, Jacques, to Commissariat a l'Energie Atomique. Gripping tool for a

cable connector plug for remote manipulation. 4,955,652, Cl. 294-106.000.
Brull, Kenneth J. Magnetic thimble. 4,955,515, Cl. 223-101.000.
Brunner GmbH: *See*—
Brunner, Rolf, 4,955,667, Cl. 297-446.000.
Brunner, Rolf, to Brunner GmbH. Seating in the form of a chair or similar piece of furniture. 4,955,667, Cl. 297-446.000.
Bruno, John. Receptacle for storage and disposal of potentially injurious implements such as used scalpel blades, hypodermic needles and the like. 4,955,477, Cl. 206-366.000.
Brunswick Corporation: *See*—
Hensel, Robert J.; and Fenrich, William G., 4,955,943, Cl. 123-73.0AD.
Snyder, Richard H., 4,955,963, Cl. 248-640.000.
Wrasidlo, Wolfgang J.; and Hofmann, Frieder K., 4,956,289, Cl. 435-180.000.
Bryan, John F., to Krupp Industrietechnik GmbH. Bucket wheel with overhead discharge. 4,955,151, Cl. 37-190.000.
Buchi Laboratoriums-Technik AG: *See*—
Steck, Arnold, 4,956,151, Cl. 422-103.000.
Buchicchio, David F.: *See*—
Gilroy, Keith; Limon, Gary T.; and Buchicchio, David F., 4,955,096, Cl. 5-464.000.
Buda, Pualette. Word forming by elimination game. 4,955,614, Cl. 273-240.000.
Budde, William A.; and Khapp, Floyd, to Budde, William A. Fuel injection conversion system for V-twin motorcycle engines. 4,955,348, Cl. 123-478.000.
Budenbender, Herbert: *See*—
Kramer, Rolf; Lohmann, Alfred; Bieker, Guido; and Budenbender, Herbert, 4,955,293, Cl. 105-199.300.
Buechel, Frederick F.: *See*—
Pappas, Michael J.; and Buechel, Frederick F., 4,955,919, Cl. 623-22.000.
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., to Battelle Memorial Institute. Electrode systems for in situ vitrification. 4,956,535, Cl. 219-10.810.
Buhrer, Carl F.; Carlsen, W. John; Cousins, Sarah S.; and Bellows, Alfred H., to GTE Laboratories Incorporated. Optical fiber cross-connect switch. 4,955,686, Cl. 350-96.200.
Bulard, Ronald A.: *See*—
Rohrer, Michael D.; and Bulard, Ronald A., 4,956,155, Cl. 422-297.000.
Bullock, Scott R.: *See*—
Leahy, Ronald S.; Smith, Patrick J.; and Bullock, Scott R., 4,956,644, Cl. 342-351.000.
Bundess, Robert G.: *See*—
Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, 4,956,075, Cl. 208-120.000.
Bunick, Frank J.: *See*—
Luo, Shiuh J.; Bunick, Frank J.; and Graf, Robert H., 4,956,458, Cl. 536-112.000.
Bunyan, Paul: *See*—
Potter, Christopher M.; Hjipieris, George; and Bunyan, Paul, 4,955,826, Cl. 439-578.000.
Burford, Sidney C.; and Hardern, David N., to Fisons plc. 4,5-dihydro pyrazole compounds. 4,956,378, Cl. 514-404.000.
Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Steegmuller, Helmut, to Robert Bosch GmbH. Conveyor device for transporting workpieces. 4,955,464, Cl. 198-463.300.
Burgher, Peter H.; Holmes, Richard L.; and Boomer, John, to Marelco Power Systems, Inc. Transformer assembly with exposed laminations and hollow housings. 4,956,745, Cl. 361-383.000.
Burke, Michael T.: *See*—
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Burke, Steven R.: *See*—
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Burns & Russell Company, The: *See*—
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Burtner, Lee W.: *See*—
Metala, Michael J.; Clark, William G., Jr.; Junker, Warren R.; Burtner, Lee W.; Arzenti, Thomas E.; Johnson, Harold P.; Vestovich, Robert P.; and Bevilacqua, Bruce W., 4,955,235, Cl. 73-601.000.
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Butler, L. Allan: *See*—
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Butler, Robert: *See*—
Sindeband, Seymour J.; and Butler, Robert, 4,956,824, Cl. 367-129.000.
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Buysch, Hans-Josef: *See*—
Leitz, Edgar; Buysch, Hans-Josef; Bottenbruch, Ludwig; and Ott, Karl-Heinz, 4,956,485, Cl. 556-446.000.
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Donate, Felipe A.; Hartwell, George E.; DeBolt, Bruce D.; Papajesk, James G.; and Buzzard, Mark V., 4,956,017, Cl. 106-311.000.
B.V. Optische Industrie 'de Oude': *See*—
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Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, 4,955,553, Cl. 242-63.000.
C. A. Weidmuller GmbH & Co.: *See*—
Beer, Dieter; Reddehase, Horst; Kerbstat, Siegfried; Hanning, Detlef; Plass, Ulrich; and Krause, Hermann, 4,956,747, Cl. 361-392.000.
C. Ehrensperger AG: *See*—
Kopp, Volker, 4,955,544, Cl. 239-304.000.
C.G.M.I. Composants Gaz pour la Microelectronique Internationale: *See*—
Dugast, Joseph, 4,955,642, Cl. 285-93.000.
C. R. Bard, Inc.: *See*—
Kvalo, Michael L.; and Carson, Culley C., 4,955,385, Cl. 128-660.030.
Zilber, Serge, 4,955,859, Cl. 604-8.000.
Cadbury Schweppes plc: *See*—
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Cadorniga, Lauro C.: *See*—
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Cage, Donald R.; and Lowe, Dean E., to Micro Motion, Inc. Apparatus for electrically interconnecting vibrating structures. 4,955,239, Cl. 73-861.380.
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Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., to Lever Brothers Company. Edible plastic dispersion. 4,956,193, Cl. 426-573.000.
Cajigas, Stanley, to Milpak Inc. Instant yogurt composition and process. 4,956,185, Cl. 426-43.000.
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Cale, Albert D., Jr.: *See*—
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Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, 4,956,282, Cl. 435-69.510.
Callaghan, Francis J.; and Vollmann, William, to Teletronics N.V. Pacemaker with improved automatic output regulation. 4,955,376, Cl. 128-419.0PG.
Callaway, James. Intravenous needle and holder assembly. 4,955,872, Cl. 604-273.000.
Calvird, Harry R., II; and Siler, Jimmie R., to Delco Electronics Corporation. Counter driven RAM engine control. 4,956,781, Cl. 364-431.040.
Campbell, Dean D.: *See*—
Kniest, James N.; and Campbell, Dean D., 4,955,225, Cl. 73-1.00J.
Canada, Her Majesty the Queen in right of, as represented by the Minister of Communications: *See*—
Martin, John E.; DeLaurier, James D.; Jull, George W.; and Lillemark, Arne, 4,955,562, Cl. 244-62.000.
Caniglia, Leslie A.; and Palicka, Cathy S. Teething rail for shopping cart. 4,955,914, Cl. 606-235.000.
Canon Denshi Kabushiki Kaisha: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.
Canon Kabushiki Kaisha: *See*—
Arai, Ryuichi; Sakaki, Mamoru; and Matsui, Shinya, 4,956,223, Cl. 428-212.000.
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,956,214, Cl. 428-64.000.
Kato, Hideo; Shibata, Hirohumi; Matsushita, Keiko; and Takamatsu, Osamu, 4,956,249, Cl. 430-5.000.
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Kitagishi, Nozomu, 4,955,715, Cl. 354-155.000.
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.
Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, 4,956,725, Cl. 360-14.300.
Matsumoto, Kozo, 4,956,804, Cl. 364-900.000.
Nagasawa, Kenichi; and Masui, Toshiyuki, 4,956,724, Cl. 360-8.000.
Nakazawa, Shinichiro, 4,955,734, Cl. 400-63.000.
Nishiguchi, Toshiji; Okamura, Moriyuki; and Nakajima, Ikuo, 4,955,901, Cl. 623-6.000.
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, 4,956,715, Cl. 358-213.190.

Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.
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Toda, Kozo, 4,956,723, Cl. 358-449.000.
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, 4,955,738, Cl. 400-229.000.
Yamada, Shigeki, 4,956,704, Cl. 358-80.000.

Caoduro, Bruno, to NOWAX s.r.l. Turbopump and similar operating machine with sealing connection structure to the motor. 4,955,793, Cl. 417-423.110.

Capanna, Dario; Romeo, Alfredo; and Mescia, Luigi, to Pierrel Hospital SpA. Container and method for washing and effectively complementing the operation of dialysis circuits and filters. 4,955,508, Cl. 222-94.000.

Caporiccio, Gerardo: *See*—
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.

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Cardiotronics, Inc.: *See*—
Way, Tim J.; and Butler, L. Allan, 4,955,381, Cl. 128-640.000.

Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno, to Tecnomagnete S.p.A. Magnetic gripping apparatus having circuit for eliminating residual flux. 4,956,625, Cl. 335-290.000.

Carey, John G.: *See*—
Jones, Michael E. B.; and Carey, John G., 4,956,266, Cl. 430-325.000.

Carignan, Roger G.; Nahigian, Stanley H.; and Pratt, Clyde R., to Techmedica, Inc. Thumb joint prosthesis. 4,955,916, Cl. 623-21.000.

Carle, Keith B.: *See*—
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Carlommagno, William D.; Cummings, Dennis E.; and Gliga, Alexandru S., to Raychem Corporation. Interconnection of electronic components. 4,955,523, Cl. 228-179.000.

Carlsen, W. John: *See*—
Buhrer, Carl F.; Carlsen, W. John; Cousins, Sarah S.; and Bellows, Alfred H., 4,955,686, Cl. 350-96.200.

Carlson, Elmer V., to Industrial Research Products, Inc. Magnetically shielded electromagnetic acoustic transducer. 4,956,868, Cl. 381-189.000.

Carlson, Karl R. Drum pedal. 4,955,277, Cl. 84-422.100.

Carol, Mark P., to Ohio Medical Instrument Company, Inc. Method and apparatus for performing stereotactic surgery. 4,955,891, Cl. 606-130.000.

Carre, Jean-Claude, to Regie Nationale des Usines Renault. Device for managing an electrohydraulic pressure control. 4,956,776, Cl. 364-424.100.

Carson, Culley C.: *See*—
Kvalo, Michael L.; and Carson, Culley C., 4,955,385, Cl. 128-660.030.

Carter, John G.: *See*—
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.

Carter, Stephen R.: *See*—
Stevens, R. D. Samuel; and Carter, Stephen R., 4,956,098, Cl. 210-748.000.

Carteron, Olivier; and Jourdain, Gerard E. A., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A. Two dimensional nozzle for a turbojet engine. 4,955,541, Cl. 239-127.100.

Carver, Larry L.; Zamzow, Charled E.; and Mladenoff, Donald D., to Northrop Corporation. Assembly data model tool system. 4,956,764, Cl. 364-167.010.

Casalegno, Italo: *See*—
Clerici, Piero R.; and Casalegno, Italo, 4,956,228, Cl. 428-336.000.

Cascone, James J.: *See*—
Zappa, Donald E.; and Cascone, James J., 4,955,403, Cl. 134-109.000.

Case Communications Inc.: *See*—
Wolensky, Joel A.; and Dunn, William A., 4,956,851, Cl. 375-8.000.

Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, to Presidenza Del Consiglio Dei Ministri. AB-006 antibiotics and process for their production. 4,956,180, Cl. 424-118.000.

Cassani, Giovanni: *See*—
Riva, Ernesto; Denaro, Maurizio; Selva, Enrico; Cassani, Giovanni; and Parenti, Francesco, 4,956,293, Cl. 435-253.200.

Casteel, Larry, to Liberty Industries. Wipe down apparatus for stretch wrapping devices. 4,955,181, Cl. 53-556.000.

Castro, Hernan A.: *See*—
Holler, Mark A.; Tam, Simon M.; and Castro, Hernan A., 4,956,564, Cl. 307-201.000.

Caterpillar Inc.: *See*—
Crabb, Elmer R.; and Spivey, William J., 4,955,442, Cl. 180-6.440.
Tamer, Antanios B., 4,956,561, Cl. 307-10.100.

Cathey, Tommy W.: *See*—
Brooks, Harvey L.; and Cathey, Tommy W., 4,955,165, Cl. 51-331.000.

Cavanna S.p.A.: *See*—
Francioni, Renzo, 4,955,184, Cl. 53-448.000.

Cavezzan, Jacques; and Di Martino, Jean-Louis, to Rhone-Poulenc Chimie. Laminated shaped article/silicone transfer adhesive. 4,956,231, Cl. 428-343.000.

Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., to R. J. Reynolds Tobacco Company. Automatic vehicle control system. 4,956,777, Cl. 364-424.020.

Cedrone, Nicholas J., to Daymarc Corporation. Broad band contactor assembly for testing integrated circuit devices. 4,956,604, Cl. 324-158.00F.

Cefin S.p.A.: *See*—
Pazzaglia, Luigi, 4,956,536, Cl. 219-64.000.

Cegedur Societe de Transformation de l'Aluminum Pechiney: *See*—
Meyer, Philippe; and Dubost, Bruno, 4,955,413, Cl. 148-12.70A.

Central Glass Company, Limited: *See*—
Kitagawa, Katsuhiko; and Maeda, Takeshi, 4,956,001, Cl. 65-107.000.

Cesaroni, Anthony J.: *See*—
Shuster, Jerry P.; and Cesaroni, Anthony J., 4,955,435, Cl. 165-170.000.

Ceskoslovenska Akademie Ved: *See*—
Sulc, Jiri; Krcova, Zuzana; Smetana, Karel; and Pitrova, Sarka, 4,955,903, Cl. 623-6.000.
Vacik, Jiri; Obereigner, Blahoslav; and Souckova, Dana, 4,956,432, Cl. 526-264.000.

Cetus Corporation: *See*—
Bjorn, Michael J.; Frankel, Arthur E.; Laird, Walter J.; Ring, David B.; and Winkelhake, Jeffrey L., 4,956,453, Cl. 530-389.000.

Chacour, Selim A.; and Colwill, William H., to American Hydro Corporation. Duplex turbine replacement unit and method. 4,955,789, Cl. 415-201.000.

Chall, Louis Edmond, Jr., to Ford Aerospace Corporation. Method of building a variety of complex high performance IC devices. 4,955,131, Cl. 29-830.000.

Chamberlain Group, Inc., The: *See*—
Cripe, Christopher A., 4,955,292, Cl. 105-4.200.

Chance, Allen; and Gray, William, to Concept Manufacturing. Spiral coil candle holder for pumpkins and other substrates. 4,955,807, Cl. 431-296.000.

Chang, Albert S. P.: *See*—
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.

Chang, Cheng-Cheng, to Hewlett-Packard Company. Interconnect structure for integrated circuits. 4,956,749, Cl. 361-414.000.

Chang, Kern K. N. Flat panel display with deflection modulation structure. 4,956,575, Cl. 313-422.000.

Chang, Wunan: *See*—
Arnold, Kenneth A.; Chang, Wunan; and Robinson, Kelly S., 4,956,668, Cl. 355-208.000.

Chang, Yunik, to Paco Pharmaceutical Services, Inc. Transdermal drug delivery using a dual permeation enhancer and method of performing the same. 4,956,171, Cl. 424-449.000.

Chao, Tai-Hsiang; Schoonover, Michael W.; and Stranford, Gerald T., to Allied-Signal Inc. High surface area cordierite catalyst support structures. 4,956,329, Cl. 502-251.000.

Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., to AT&T Bell Laboratories. Optical fiber package and methods of making. 4,955,688, Cl. 350-96.290.

Chavez, Javier, to Intevep, S.A. Rotary drill bits with plural sealing systems. 4,955,440, Cl. 175-371.000.

Chawan, Dhyaneshwar B.; Merritt, Carleton G.; and Ibrahim, Radwan H., to Borden, Inc. Tempering and milling of edible grains and leguminous materials with reducing agents and methods of making alimentary products. 4,956,190, Cl. 426-269.000.

Chen, Michael. Burglar proof device for automobile use. 4,956,629, Cl. 340-429.000.

Chen, Sen-Lung. Ultraviolet lamp assembly. 4,956,754, Cl. 362-101.000.

Chen, Tsai-An. Cake manufacturing machine. 4,955,288, Cl. 99-348.000.

Cheng, Thong-Meng: *See*—
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.

Cherlo, Victor M. Integrated tool control for work station. 4,956,589, Cl. 318-67.000.

Chermann, Jean-Claude; Rouquette, Blandine; Rey, Francoise; and Barre-Sinoussi, Francoise, to Institut Pasteur. Viral strain isolated from cerebrospinal fluid of an HIV seropositive man having acute and regressive encephalopathy and use of the strain in an immunoassay. 4,956,292, Cl. 435-235.000.

Chemse Medical, Inc.: *See*—
Kroll, Mark W.; and Pommrehn, Mark R., 4,956,877, Cl. 455-605.000.

CHF Industries, Inc.: *See*—
Marinescu, Florin; Patel, Bakulesh N.; and Hammond, William M., 4,955,420, Cl. 160-178.200.

Chiang, Yung-Tung, to Chyuan How Enterprise Co., Ltd. Automatic corkscrew. 4,955,261, Cl. 81-3.200.

Chiesi Farmaceutici S.p.A.: *See—*
Chiesi, Paolo; and Servadio, Vittorino, 4,956,384, Cl. 514-470.000.

Chiesi, Paolo; and Servadio, Vittorino, to Chiesi Farmaceutici S.p.A. 1,4:3,6-dianhydrosorbitol 2-mononitrate and 5-mononitrate esters and pharmaceutical compositions therefrom. 4,956,384, Cl. 514-470.000.

Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., to Mobil Oil Corp. Heterogeneous isoparaffin/olefin alkylation. 4,956,518, Cl. 585-726.000.

Childers, Robert W.: *See—*
Cummings, Arthur L.; and Childers, Robert W., 4,956,145, Cl. 422-28.000.

Ching, Daw-Long. Removable mounting assembly for fog lights and flag poles. 4,955,577, Cl. 248-539.000.

Chino, Shuichi: *See—*
Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, 4,956,445, Cl. 528-230.000.

Chitty, Joseph M.: *See—*
Hubert, Jean-Luc; Chitty, Joseph M.; and Ellett, William A., 4,956,042, Cl. 156-344.000.

Chiu, David. Mini foldable cycle. 4,955,628, Cl. 280-239.000.

Chivas Products Limited: *See—*
Lorence, Brian S.; and Phelps, Richard A., 4,955,571, Cl. 248-311.200.

Chiyoda Chemical Engineering & Construction Co., Ltd.: *See—*
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.780.

Cho, Byung W.: *See—*
Yun, Kyung S.; and Cho, Byung W., 4,956,067, Cl. 204-212.000.

Choh, Nobuo: *See—*
Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, 4,956,358, Cl. 514-202.000.

Choi, Sung Hui. Centrifugal bio-contactor apparatus. 4,956,082, Cl. 210-150.000.

Chou, Tai-Sheng: *See—*
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.

Chr. Hansen's Laboratory, Inc.: *See—*
Sudoma, A. Louis, 4,956,295, Cl. 435-252.100.

Christensen, Bruno: *See—*
Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.

Christensen, Thorkild; Thomsen, Svend E.; and Zenker, Siegfried, to Danfoss A/S; and Danfoss A/S. Damping arrangement for damping the oscillations of valve controlled by pressure fluid. 4,955,194, Cl. 60-329.000.

Christenson, Philip A.; and Drake, Brian J., to BASF K & F Corp. Alkyltetramethylcyclohexane derivatives and their use as perfumes. 4,956,342, Cl. 512-24.000.

Christie, Craig; and Nykoluk, Michael, to Electro Rubber Limited. Electrical connector device. 4,955,814, Cl. 439-77.000.

Christmas, Robert R. Card game apparatus and method. 4,955,619, Cl. 273-273.000.

Chrysler Corporation: *See—*
Glowczewski, Thomas, Macomb County; and Carle, Keith B., 4,955,336, Cl. 123-179.00B.

Chu, Cynthia T-W., to Mobil Oil Corp. Process for converting olefins to higher hydrocarbons. 4,956,514, Cl. 585-533.000.

Chu, Daniel T.; and Rosen, Terry J., to Abbott Laboratories. Preparationof enantiomerically pure 3-protected amino-pyrrolidines. 4,956,475, Cl. 548-557.000.

Chu, Hsien-Kun; Kamis, Russell P.; Klosowski, Jerome M.; and Lower, Loren D., to Dow Corning Corporation. Neutral cure silicone sealants. 4,956,435, Cl. 528-17.000.

Chu, Pochen: *See—*
Johnson, Ivy D.; Chu, Pochen; and Kresge, Charles T., 4,956,517, Cl. 585-660.000.

Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., to Mobil Oil Corporation. Slip coated thermoplastic films. 4,956,233, Cl. 428-349.000.

Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., to Mobil Oil Corporation. Slip coated thermoplastic films. 4,956,241, Cl. 428-516.000.

Chu, Wei-Kan: *See—*
Reeber, Robert R.; Chu, Wei-Kan; and Bedair, Salah M., 4,956,000, Cl. 65-18.100.

Chyuan How Enterprise Co., Ltd.: *See—*
Chiang, Yung-Tung, 4,955,261, Cl. 81-3.200.

Ciba Corning Diagnostics Corp.: *See—*
Piran, Uri; Stastny, Milos; and Uretsky, Laura S., 4,956,299, Cl. 436-18.000.

Ciba-Geigy Corporation: *See—*
Bernheim, Michael; Strasilla, Dieter; De Sousa, Bernardo; and Rohringer, Peter, 4,956,049, Cl. 162-158.000.
Lacroix, Roger; and Ruhlmann, Edmond, 4,955,987, Cl. 8-549.000.

Ciba-Geigy Corportion: *See—*
Heitkamp, Richard R., 4,956,217, Cl. 428-116.000.

Ciccone, Frank E., to International Nautical Supplies, Inc. Yieldable line assembly and in line shock absorber. 4,955,309, Cl. 114-230.000.

Cidaria, Dante: *See—*
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

Cipollina, Joseph A.; and Ruediger, Edward H., to Bristol-Myers Company. Metabolites and prodrug formulations of 8-[4-[4-(1,2-benzisothiazol-3-yl)-1-piperazinyl]butyl]-8-azaspiro[4.5]decane-7,9-dione. 4,956,368, Cl. 514-254.000.

Circon Corporation: *See—*
Grossi, Benedetto; Ainger, Raymond, III; and Muller, Richard P., 4,955,884, Cl. 606-46.000.

Clarion Co., Ltd.: *See—*
Kobayashi, Shigeotshi, 4,955,678, Cl. 312-320.000.

Clark, Allan H.: *See—*
Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., 4,956,193, Cl. 426-573.000.

Clark, Daniel O.: *See—*
Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, 4,955,993, Cl. 55-16.000.

Clark Equipment Company: *See—*
Albright, Larry E.; Mather, Joseph M.; Loraas, Orlan J.; and Lynnes, Carman, 4,955,455, Cl. 180-291.000.

Clark, Lloyd T.; and Marshall, James W. Apparatus for applying a sulphur-based structural material to paved surfaces. 4,955,721, Cl. 366-24.000.

Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, to Syntex (U.S.A.) Inc. Decahydro-8H-isoquino(2,1-g)(1,6)naphthyridine derivatives and related compounds. 4,956,365, Cl. 514-233.200.

Clark, William G., Jr.: *See—*
Metala, Michael J.; Clark, William G., Jr.; Junker, Warren R.; Burtner, Lee W.; Arzenti, Thomas E.; Johnson, Harold P.; Vestovich, Robert P.; and Bevilacqua, Bruce W., 4,955,235, Cl. 73-601.000.

Clarke, Roy: *See—*
Merlin, Roberto; and Clarke, Roy, 4,955,692, Cl. 350-166.000.

Clerici, Piero R.; and Casalegno, Italo, to Ausonia S.p.A. Dismemberable adhesive junction system. 4,956,228, Cl. 428-336.000.

Clinthorne, Neal H.: *See—*
Rogers, W. Leslie; and Clinthorne, Neal H., 4,956,796, Cl. 364-581.000.

Clissett, Peter A. G.; and Lacey, Roger A., to Acco Cable Controls Limited. Cable-and-sleeve connections. 4,955,252, Cl. 74-502.400.

Clorox Company, The: *See—*
Zielski, Alfred G.; and Fong, Ronald A., 4,956,117, Cl. 252-186.380.

Clotten, Wilfried; and Feige, Rainer, to J. A. Henckels Zwillingswerk Aktiengesellschaft. Cutting tools having a plastic handle. 4,955,139, Cl. 30-340.000.

Coan, Frederick L.: *See—*
Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, 4,955,993, Cl. 55-16.000.

Coates, Roger J.: *See—*
Mattingly, Bruce W.; and Coates, Roger J., 4,955,474, Cl. 206-320.000.

Cobb, Raymond L.: *See—*
Matson, Michael S.; and Cobb, Raymond L., 4,956,507, Cl. 570-140.000.

Coca-Cola Company, The: *See—*
Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., 4,955,507, Cl. 222-65.000.

Cockrum, Charles A.; Barton, Jeffrey B.; and Schulte, Eric F., to Santa Barbara Research Center. Buried junction infrared photodetector process. 4,956,304, Cl. 437-5.000.

Coffey, Arthur C.: *See—*
Badylak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., 4,956,178, Cl. 424-551.000.

Coggins, Peter R.; Mitchell, Andrew L.; Brothers, Paul; and Muir, William L. Mammary prosthesis injector. 4,955,906, Cl. 623-8.000.

Cohen, Mordechai, to Sundstrand Corporation. Fan structure with flow responsive switch mechanism. 4,955,785, Cl. 415-26.000.

Cohen, Robert C.: *See—*
Zarnowski, Alfred J.; and Cohen, Robert C., 4,955,325, Cl. 623-22.000.

Coker, Thomas G.: *See—*
Dempsey, Russell M.; Coker, Thomas G.; LaConti, Anthony B.; and Fragala, Anthony R., 4,956,061, Cl. 204-128.000.

Colberg, Horst: *See—*
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, 4,956,464, Cl. 546-57.000.

Colditz, Eugene F.: *See—*
Grills, Lawrence M.; and Colditz, Eugene F., 4,955,091, Cl. 4-321.000.

Cole, Richard J.: *See—*
Dowd, Patrick F.; and Cole, Richard J., 4,956,343, Cl. 514-11.000.

Cole, Ronald E., to Emhart Industries, Inc. Electromechanical timer with improved blade retention. 4,956,527, Cl. 200-38.00R.

Coleman, Jeffrey O., to Boeing Company, The. Coherence multiplexed optical signal transmission system and method. 4,956,834, Cl. 370-1.000.

Coleman, John R.; and Schubert, Malvin L., to General Motors Corporation. Master cylinder attachment adapter. 4,955,197, Cl. 60-547.100.

Collmer, Rosemarie: *See—*
Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Steegmuller, Helmut, 4,955,464, Cl. 198-463.300.

Colone, William M.: *See—*
Della Corna, Linda V.; Farnan, Robert C.; Colone, William M.; and Kowligi, Rajagopal R., 4,955,899, Cl. 623-1.000.

Colthurst Limited: *See*—
Prendergast, Patrick T., 4,956,355, Cl. 514-178.000.

Colton, James P.: *See*—
Kifer, Edward W.; Wojtyna, V ncent J.; Colton, James P.; and Stickel, Jeffrey T., 4,956,39-, Cl. 521-84.100.

Columbia Technology Corp.: *See*—
King, Martin J., 4,955,101, Cl. 15-21.100.

Columbia University in the City of New York, The Trustees of: *See*—
Pawluk, Robert J., 4,955,886, Cl. 606-69.000.

Columbus Industries, Inc.: *See*—
Pontius, Jeffrey S., 4,955,995, Cl. 55-274.000.

Colwill, William H.: *See*—
Chacour, Selim A.; and Colwill, William H., 4,955,789, Cl. 415-201.000.

Com-Ser Laboratories, Inc.: *See*—
Bernard, William B.; and Minteer, William B., 4,956,875, Cl. 455-13.000.

Comai, Luca: *See*—
Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, 4,956,282, Cl. 435-69.510.

Commandeur, Raymond; and Gurtner, Bernard, to Atochem. Polyarylalkane oligomer compositions and process for their manufacture. 4,956,120, Cl. 252-364.000.

Commissariat a l'Energie Atomique: *See*—
Brugere, Robert; Faure, Robert; Galmard, Yves; and Gerenton, Jacques, 4,955,652, Cl. 294-106.000.

Compagnie de Raffinage et de Distribution Total France: *See*—
Gouzard, Jean P.; and Szabo, Georges, 4,956,322, Cl. 502-62.000.

Concept Manufacturing: *See*—
Chance, Allen; and Gray, William, 4,955,807, Cl. 431-296.000.

Confalonieri, Giovanni: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

Conishi, Toshihiko: *See*—
Ootsuki, Noboru; Tomioka, Katsumi; and Conishi, Toshihiko, 4,955,122, Cl. 29-237.000.

Connaught Laboratories Limited: *See*—
Hommel, Martin; Sun, Anthony M.; and Goosen, Mattheus F. A., 4,956,128, Cl. 264-4.000.

Conoco Inc.: *See*—
Latimer, Edward G., 4,956,506, Cl. 568-899.000.

Conroy, David G.: *See*—
George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., 4,956,809, Cl. 364-900.000.

Consolidated Rail Corporation: *See*—
Murphy, Wayne H., 4,955,459, Cl. 188-32.000.

Conston, Stanley R.: *See*—
Yamamoto, Ronald K.; and Conston, Stanley R., 4,955,890, Cl. 606-108.000.

Container Corporation of America: *See*—
Sorci, Anthony L., 4,955,502, Cl. 220-22.000.

Continental American Corporation: *See*—
Younis, Donna; and Yeung, Eileen, 4,955,412, Cl. 141-114.000.

Cookson Group PLC: *See*—
Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., 4,956,441, Cl. 528-171.000.

Cooper Industries, Inc.: *See*—
Barber, Donald E., 4,955,651, Cl. 294-82.190.
Helmich, Melvin J., 4,955,326, Cl. 123-27.0GE.

Cooperrider, Myron T.: *See*—
Briggs, Eugene C.; and Cooperrider, Myron T., 4,955,359, Cl. 126-110.00R.

CooperVision Optics Limited: *See*—
Seden, William E.; Shepherd, David W. J.; and Henderson, Peter, 4,955,580, Cl. 249-82.000.

Copeland Corporation: *See*—
Griffith, Russell W., 4,955,795, Cl. 417-44.000.

Coplin, John F., to Rolls-Royce plc. Low drag surface. 4,955,565, Cl. 244-199.000.

Copolymer Rubber & Chemical Corporation: *See*—
Sumeri, Ronald H.; and O'Rourke, Michael W., 4,956,501, Cl. 525-64.000.

Corcoran, Edward W., Jr.; Haushalter, Robert C.; and Lai, Wen-Yih F., to Exxon Research and Engineering Company. Molybdenum phosphate compositions. 4,956,483, Cl. 556-26.000.

Corey, George A., to University of Florida. Hypodermic needle recapping device. 4,955,866, Cl. 604-192.000.

Cornelli, Umberto: *See*—
Ban, Thomas A.; and Cornelli, Umberto, 4,956,347, Cl. 514-54.000.

Cosement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, to U C B S.A. 2-amino-4-morpholino-6-propyl-1,3,5-triazines. 4,956,367, Cl. 514-236.200.

Cosement, Eric: *See*—
Wulfert, Ernst; Gobert, Jean; and Cosement, Eric, 4,956,363, Cl. 514-232.200.

Cote, William J.; Kaanta, Carter W.; Leach, Michael A.; and Paulsen, James K., to International Business Machines Corporation. Via-filling and planarization technique. 4,956,313, Cl. 437-203.000.

Courduvelis, Constantine I., to Enthone, Incorporated. Waste treatment of metal containing solutions. 4,956,097, Cl. 210-718.000.

Cousins, Sarah S.: *See*—
Buhrer, Carl F.; Carlsen, W. John; Cousins, Sarah S.; and Bellows, Alfred H., 4,955,686, Cl. 350-96.200.

Cousins, Walter K., to Whirlpool Corporation. Vacuum cleaner beater brush with a biased bristle strip. 4,955,102, Cl. 15-182.000.

Coutts, Stephen M.: *See*—
Shoupe, T. Scott; Coutts, Stephen M.; and Dolby, Lloyd J., 4,956,371, Cl. 514-307.000.

Covey, Rupert A.; Forbes, Patricia J.; Bell, Allyn R.; and Blem, Allen R., to Uniroyal Chemical Company, Inc. Preparation of substituted tetrazolinones. 4,956,469, Cl. 548-251.000.

Cowan, Jack C.; House, Roy F.; and Granquist, Victor M., to Venture Chemicals, Inc. Organophilic polymers. 4,956,104, Cl. 252-8.551.

Cowen, Russell A., to Tecumseh Products Company. Valve indexing for a compressor. 4,955,797, Cl. 418-15.000.

Cox, James W.: *See*—
Lewis, Alfred M.; and Cox, James W., 4,955,351, Cl. 123-557.000.

Coyman, Dennis; and Gawronski, Richard, to Master Free Time, Inc. Multi-year time clock having automatic daylight saving time compensator. 4,956,826, Cl. 368-28.000.

Crabb, Elmer R.; and Spivey, William J., to Caterpillar Inc. Steering mechanism for a vehicle. 4,955,442, Cl. 180-6.440.

Craddock, Gary D. Floating boat lift. 4,955,308, Cl. 114-45.000.

Craig, Robin: *See*—
Evers, Dennis; and Craig, Robin, 4,956,064, Cl. 204-157.940.

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Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.

Daikoku, Takahiro: *See*—
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Schiesle, Edmund; and Alasafi, Khaldoun, 4,955,241, Cl. 73-862.690.
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Benz, Erwin; Rau, Wolfgang; Bauer, Rainer; and Willy, Gerd, 4,955,570, Cl. 248-300.000.
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Rosowsky, Andre, 4,956,461, Cl. 544-258.000.
Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.
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Petersen, Jens K.; and Sorensend, Ole V., 4,955,444, Cl. 180-132.000.
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Daniloff, Joanne K., to Louisiana State University. Neural cell adhesion protein nerve prosthesis. 4,955,892, Cl. 606-152.000.
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Kozakiewicz, Joseph J.; and Dauplaise, David L., 4,956,400, Cl. 523-223.000.
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Cedrone, Nicholas J., 4,956,604, Cl. 324-158.00F.
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Culley, Jeffrey L.; Frazier, Darrell E.; and Frisch, Anthony E., 4,956,691, Cl. 357-41.000.
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Delmore, Martin F.: *See—*
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Dent, Larry G. Pipe seals used in underground sealed distribution systems. 4,955,641, Cl. 285-96.000.
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, to BASF Aktiengesellschaft. Preparation of oxyalkylated, carboxyl-containing polymers. 4,956,421, Cl. 525-385.000.
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Dickerson, John A. Hydraulically driven fan system for water cooling tower. 4,955,585, Cl. 261-26.000.
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Diehr, Hans-Joachim; and Becker, Benedikt, to Bayer Aktiengesellschaft. Pesticidal 3-substituted 1-nitro-2-imino-1,3-diazacycloalkanes. 4,956,356, Cl. 514-341.000.
Diekmann, Stephan. Separation or reaction column unit. 4,956,298, Cl. 430-311.000.
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Stern, Donald J.; Heaton, Jeff S.; Tryon, James A.; and Barthelmey, Brett A., 4,955,545, Cl. 239-320.000.
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Dr. Johannes Heidenhain GmbH: *See*—
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Donaghy, David J., to White Consolidated Industries, Inc. Hinged panels with foamed-in-place insulation. 4,955,675, Cl. 312-214.000.
Donate, Felipe A.; Hartwell, George E.; DeBolt, Bruce D.; Papajesk, James G.; and Buzzard, Mark V., to Dow Chemical Company, The. Non-volatile 1,1,1-trichloroethane inhibitors. 4,956,017, Cl. 106-311.000.
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Donovan, Michael F.: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Koileen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
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Dougherty Patrick F.; and Ashby, Chris A. Athletic movement trainer. 4,955,608, Cl. 273-29.00A.
Douglas, Harley W. Screw driver tip. 4,955,936, Cl. 81-441.000.
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Hefner, John G., 4,956,323, Cl. 502-113.000.
Hefner, Robert E., Jr.; and Haynes, Deborah I., 4,956,425, Cl. 525-524.000.
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Liu, Ming-Biann; Godschalx, James; Ecker, Ernest; and Caldecourt, Alfred, 4,956,442, Cl. 528-205.000.
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,956,235, Cl. 428-368.000.
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Gutek, Beth L, 4,956,221, Cl. 428-142.000.
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Lo, Sunny J.; Swihart, Terence J.; and Ward, Andrew H., 4,956,472, Cl. 548-406.000.
Marko, Ollie W.; and Steinmeyer, Robert D., 4,956,486, Cl. 556-466.000.
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Dugast, Joseph, to C.G.M.I. Composants Gaz pour la Microelectronique Internationale. Pipe connector, in particular for gases. 4,955,642, Cl. 285-93.000.
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Dulaney, Eugene L.: *See*—
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Smith, Wallace B.; and Giovanni, Dan V., 4,956,162, Cl. 423-244.000.
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Groth, John E.; Delmore, Martin F.; and Laughlin, Raymond S., 4,955,825, Cl. 439-535.000.

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Guena, Jean; Leost, Jean-Claude; and Meyer, Sylvain, 4,956,645, Cl. 342-361.000.

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Lanza, Richard C.; and Votano, Joseph R., 4,956,859, Cl. 378-157.000.

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Gutierrez, Antonio; and Lundberg, Robert D., 4,956,107, Cl. 252-47.000.
Lenack, Alain L. P.; and Kech, Fernand J., 4,956,110, Cl. 252-49.500.
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Ichisa, Nobuaki, 4,956,846, Cl. 372-58.000.
Iwagaya, Takashi, 4,956,765, Cl. 364-192.000.
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Haase, Roger L.; and Fitzgibbons, Gary W., 4,955,526, Cl. 229-69.000.
FitzPatrick, Vincent F.: *See*—
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
Flabbi, Luciano: *See*—
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.
Flanigen, Edith M.: *See*—
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,956,164, Cl. 423-306.000.
Lok, Brent M. T.; Marcus, Bonita K.; Messina, Celeste A.; Wilson, Stephen T.; and Flanigen, Edith M., 4,956,165, Cl. 423-306.000.
Flett, David S.; and Lloyd, John E., to Imperial Chemical Industries PLC. Separation process. 4,956,520, Cl. 585-815.000.
Flow Research, Inc: *See*—
Hashish, Mohamed; and Craigen, Steve, 4,955,164, Cl. 51-321.000.
Fluck, Rene , to SIG Schweizerische Industrie-Gesellschaft. Apparatus for forming and conveying groups of flat stacked items. 4,955,794, Cl. 414-790.400.
Fluor Corporation: *See*—
Kallenbach, Ralph, 4,955,467, Cl. 188-381.000.
FMC Corporation: *See*—
Theodoridis, George, 4,956,004, Cl. 71-93.000.
Fochler, Stephen H. Multi-pronged thumbtack. 4,955,813, Cl. 411-457.000.
Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz; and Schulte, Josef, 4,955,948, Cl. 131-280.000.
Focke, Heinz; and Schulte, Josef, to Focke & Co. (GmbH & Co.). Process and apparatus for the checking of cigarettes. 4,955,948, Cl. 131-280.000.
Foglietti, Joe. Cyclops lighted motorcycle helmet. 4,956,752, Cl. 362-72.000.
Foller, Werner; and Klann, Holm, to Gestra Aktiengesellschaft. Thermally controlled valve. 4,955,536, Cl. 236-48.00R.
Fong, Ronald A.: *See*—
Zielski, Alfred G.; and Fong, Ronald A., 4,956,117, Cl. 252-186.380.
Foote, Wayne E.; and Swantner, Richard L., to Hewlett-Packard Company. Actuator magnetic circuit. 4,956,735, Cl. 360-106.000.
Forbes, Patricia J.: *See*—
Covey, Rupert A.; Forbes, Patricia J.; Bell, Allyn R.; and Blem, Allen R., 4,956,469, Cl. 548-251.000.
Ford Aerospace Corporation: *See*—
Chall, Louis Edmond, Jr., 4,955,131, Cl. 29-830.000.
McCauley, Donald D.; and Bayless, John D., Jr., 4,955,129, Cl. 29-611.000.
Ford New Holland, Inc.: *See*—
Bohman, Carl E., 4,955,437, Cl. 172-1.000.
Van Eecke, Roger H.; and Naaktgeboren, Adrianus, 4,955,774, Cl. 414-111.000.
Formatec Tooling Systems, Inc.: *See*—
Stodd, Ralph P.; and Stewart, Harry D., 4,955,223, Cl. 72-336.000.
Forrester, Keith E. Ski case sled. 4,955,519, Cl. 224-319.000.
Forsberg, John W., to Lubrizol Corporation, The. Explosive compositions. 4,956,028, Cl. 149-2.000.
Forsgren, Ulf E.: *See*—
Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjoberg, Berndt O. H., 4,956,179, Cl. 424-114.000.
Fosnaes, Frank: *See*—
Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.
Fospur Limited: *See*—
Barwise, Christopher H., 4,956,077, Cl. 209-166.000.
Fouali, Tellef;; Reichelt, Karl L.; Skraastad, Oyvind; and Edminson, Paul D., to Hafslund Nycomed A/S. Method for treatment of lesions in the large intestinal epithelium with a tripeptide. 4,956,344, Cl. 514-18.000.
Foster, James E.: *See*—
Dillon, David M.; Boyer, Michael R.; and Foster, James E., 4,955,291, Cl. 104-299.000.
Foster Wheeler Development Corporation: *See*—
Robertson, Archibald S., Jr., 4,955,190, Cl. 60-39.020.
Foster Wheeler Energy Corporation: *See*—
Abdulally, Iqbal F., 4,955,295, Cl. 110-263.000.
Foster Wheeler USA Corporation: *See*—
Ziemianek, Janusz B., 4,955,323, Cl. 122-4.00D.
Foulsham, Peter G.: *See*—
Machell, Anthony; and Foulsham, Peter G., 4,955,558, Cl. 244-3.220.
Fowler, Allan R.: *See*—
Albrecht, Leonard N.; and Burke, Steven R., 4,955,153, Cl. 40-661.000.
Fowler, Geoff G.: *See*—
King, Stephen W.; Fowler, Geoff G.; and Vandenbergh, Peter A., 4,956,177, Cl. 424-93.000.
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Dempsey, Russell M.; Coker, Thomas G.; LaConti, Anthony B.; and Fragala, Anthony R., 4,956,061, Cl. 204-128.000.
Fralick, Richard D.; and Ekstrom, Philip A., to Northwest Marine Technology, Inc. Method for tagging macro-organisms. 4,955,396, Cl. 128-898.000.
Frame, Robert R.: *See*—
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., 4,956,324, Cl. 502-163.000.
Franceschi, Giovanni; Vioglio, Sergio; and Bianchini, Roberto, to Farmitalia Carlo Erba S.R.L. Pharmaceutical composition comprising 3-(N-piperidinoethyl-azino) methylrifamycin S as active ingredient. 4,956,373, Cl. 514-321.000.
Francioni, Renzo, to Cavanna S.p.A. Method and equipment for forming multiple packs of products, particularly food products. 4,955,184, Cl. 53-448.000.
Frankel, Arthur E.: *See*—
Bjorn, Michael J.; Frankel, Arthur E.; Laird, Walter J.; Ring, David B.; and Winkelhake, Jeffrey L., 4,956,453, Cl. 530-389.000.
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Wheeler, Edward L.; and Franko, Robert J., 4,956,405, Cl. 524-100.000.
Frans Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; and Hansmann, Johann, 4,955,302, Cl. 104-7.200.
Franz, Michael; and Lundquist, Ingemar, to EP Technologies. Apparatus and method for recording monophasic action potentials from an in vivo heart. 4,955,382, Cl. 128-642.000.
Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; Hansmann, Johann; and Worgotter, Herbert, 4,955,301, Cl. 104-7.200.
Fraunhofer Gesellschaft zur Forderund der Angewandten Forschung E.V.: *See*—
Kossatz, Gert; Heine, Wolfgang; Lempfer, Karsten; and Sattler, Heinz, 4,955,171, Cl. 52-612.000.
Frazier, Darrell E.: *See*—
Culley, Jeffrey L.; Frazier, Darrell E.; and Frisch, Anthony E., 4,956,691, Cl. 357-41.000.
Frazier Industrial Company: *See*—
Allen, Donald R., 4,955,489, Cl. 211-151.000.
Freeman, Ferre M. Universal medical forcep tool. 4,955,896, Cl. 606-210.000.
Freeman, Gerald C.; and Feinland, Seymour, to Pitney Bowes Inc. Mailing system for mixed weight mail. 4,956,782, Cl. 364-464.030.

Freeman, Lucius J.; and Gagen, Paul F., to AT&T Bell Laboratories. Optical fiber connector. 4,955,976, Cl. 350-96.210.
Freier, Fred, to Egli, Fischer & Co. AG. Pipe clip. 4,955,574, Cl. 248-316.500.
Freisinger, Henry: *See*—
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.
Fres-co System USA, Inc.: *See*—
Beer, Jeffrey S.; and Gracie, Michael D., Sr., 4,955,479, Cl. 206-455.000.
Frey, Andre F. Device for the in situ repair of a pipe. 4,955,755, Cl. 405-155.000.
Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Metallic intervertebral prosthesis. 4,955,908, Cl. 623-17.000.
Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Bone implant. 4,955,911, Cl. 623-16.000.
Frick, Vincent, to United States of America, Air Force. Method of creating passageways in niobium by CVD of niobium over sintered vanadium which is thereafter leached. 4,956,201, Cl. 427-181.000.
Friedman, Maurice: *See*—
Miller, Edward J.; Beukers, John M.; and Friedman, Maurice, 4,956,646, Cl. 343-706.000.
Friedrich, Karl, to Kramer-Werke GmbH. Vehicle, especially a loader. 4,955,664, Cl. 296-204.000.
Friel, Thomas C., Jr.; and O'Lenick, Anthony J., Jr. Particulate defoaming compositions. 4,956,119, Cl. 252-358.000.
Friese, Hans-Herbert: *See*—
Fabry, Bernd; Friese, Hans-Herbert; Pieper, Friedrich; and Uphues, Guenter, 4,956,116, Cl. 252-174.160.
Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, to Boehringer Biochemia Robin S.p.A. 2-dithioalkyl-dihydropyridines and pharmaceutical compositions containing them. 4,956,369, Cl. 514-274.000.
Frisch, Anthony E.: *See*—
Culley, Jeffrey L.; Frazier, Darrell E.; and Frisch, Anthony E., 4,956,691, Cl. 357-41.000.
Frisk, Don L., to PZF, Inc. Shoulder harness reel assembly with automatic reel lock. 4,955,556, Cl. 242-107.40B.
Frito-Lay, Inc.: *See*—
Beaty, Dennis W.; and Shafer, C. Brooks, 4,955,226, Cl. 73-49.300.
Fritz Eichenauer GmbH & Co. KG: *See*—
Ohnmacht, Helmut; Nauerth, Karl-Heinz; and Meywald, Klaus, 4,956,545, Cl. 219-541.000.
Fritz Schafer Gesellschaft mit beschrankter Haftung: *See*—
Schafer, Gerhard, 4,955,490, Cl. 211-187.000.
Fritzsche, Peter: *See*—
Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, 4,955,266, Cl. 19-105.000.
Froese-Peeck, Ruediger; and Poleschinski, Richard, to Siemens Aktiengesellschaft. Method and apparatus for automatically adjusting the focus of cathode ray tubes. 4,955,680, Cl. 315-382.000.
Frohning, Carl D.; and Horn, Gerhardt, to Hoechst Aktiengesellschaft. Process for the preparation of catalyst compositions containing nickel, alumina, and zirconium dioxide and catalysts made therefrom. 4,956,328, Cl. 502-242.000.
Froning, Edilbert A. K.; and Langner, Klaus A. Device for carrying out field supported ion exchange in plane-parallel plates. 4,956,066, Cl. 204-243.00R.
Fruzinsky, Otto: *See*—
Wellershaus, Ulf; and Fruzinsky, Otto, 4,955,920, Cl. 623-36.000.
Fry, David, to Diversified Graphics, Ltd. Method of adhering holograms to textile wearing apparel. 4,956,040, Cl. 156-267.000.
Fry, Francis J.; and Sanghvi, Narendra T., to Laboratory Equipment, Corp. Localization and therapy system for treatment of spatially oriented focal disease. 4,955,365, Cl. 128-24.00A.
Fryd, Michael; Leberzammer, Ernst; and Sebastian, S. Andries R., to Du Pont de Nemours, E. I., and Company. Aqueous processible photosensitive compositions containing core shell microgels. 4,956,252, Cl. 430-138.000.
Fuji Electric Co., Ltd.: *See*—
Kuroda, Masami; Sugata, Yoshinobu; and Furusho, Noboru, 4,956,250, Cl. 430-58.000.
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.
Nakanishi, Shingo; and Yamamoto, Susumu, 4,955,790, Cl. 417-45.000.
Nishibe, Takashi; and Yokoyama, Shotaro, 4,956,546, Cl. 250-203.100.
Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, 4,956,245, Cl. 429-26.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Kotajima, Takao, 4,955,848, Cl. 474-28.000.
Tohmiya, Masato, 4,955,342, Cl. 123-339.000.
Yamaashi, Shunji; and Arai, Yoshimitsu, 4,955,255, Cl. 74-856.000.
Fuji Machinery Company Ltd.: *See*—
Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, 4,955,176, Cl. 53-73.000.
Fuji Photo Film Co., Ltd.: *See*—
Hayata, Youichi; and Matsui, Michihiro, 4,956,728, Cl. 360-66.000.
Ikeda, Hideo; and Ohno, Shigeru, 4,956,269, Cl. 430-505.000.
Inoue, Nobuaki, 4,956,257, Cl. 430-264.000.
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.
Masuda, Toshiyuki, 4,956,213, Cl. 428-64.000.
Nakada, Junji; and Takeuchi, Hideaki, 4,956,070, Cl. 204-298.180.
Nakamura, Koichi, 4,956,260, Cl. 430-138.000.
Nakamura, Taku, 4,956,253, Cl. 430-138.000.
Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, 4,956,268, Cl. 430-393.000.
Shiraishi, Hisashi, 4,956,559, Cl. 250-484.100.
Tsukase, Masaaki; and Sato, Kozo, 4,956,456, Cl. 534-615.000.
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
Washizu, Shintaro; Usami, Toshimasa; Tatsuta, Sumitaka; and Yamaguchi, Jun, 4,956,251, Cl. 430-138.000.
Washizu, Shintaro; and Yamaguichi, Jun, 4,956,254, Cl. 430-138.000.
Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, 4,956,229, Cl. 428-336.000.
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.
Fuji Xerox Co., Ltd.: *See*—
Hiroshige, Ken; and Ueha, Sadayuki, 4,955,598, Cl. 271-267.000.
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,956,670, Cl. 355-210.000.
Urata, Manabu, 4,956,684, Cl. 357-17.000.
Fujibayashi, Kentaro: *See*—
Kawamura, Hideaki; Fujibayashi, Kentaro; and Hidaka, Yosato, 4,956,785, Cl. 364-474.010.
Fujii, Akira: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.
Fujii, Eiichiro, to Kabushiki Kaisha Toshiba. Bearing having a valve seat for a rotary compressor. 4,955,414, Cl. 148-324.000.
Fujii, Masao: *See*—
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Goro; and Fujii, Masao, 4,955,327, Cl. 123-41.420.
Fujimori, Shizuyoshi: *See*—
Kojima, Eisuke; Fujimori, Shizuyoshi; and Awano, Katsuya, 4,956,372, Cl. 514-311.000.
Fujimoto, Akihiko: *See*—
Suda, Nobuyuki; Fujimoto, Akihiko; and Suzuki, Ryuji, 4,955,127, Cl. 29-568.000.
Fujimoto, Hiroshi: *See*—
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
Fujinoki, Akira: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
Fujioka, Futoshi: *See*—
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Bodea, Richard M., 4,956,481, Cl. 549-459.000.
Fujisawa Pharmaceutical Co., Ltd.: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.
Fujita, Kozo: *See*—
Ise, Kiyotaka; and Fujita, Kozo, 4,955,448, Cl. 180-197.000.
Fujita, Minoru; and Fukushima, Yoichi, to Kyodo Printing Co., Ltd. Optical recording card and method of producing the same. 4,956,215, Cl. 428-64.000.
Fujita, Toshiki; Kimura, Hirokazu; and Yamato, Yoshihiro, to Toyo Garasu Kabushiki Kaisha. Apparatus for inspecting glass bottles. 4,955,227, Cl. 73-104.000.
Fujita, Yoshikazu: *See*—
Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, 4,956,268, Cl. 430-393.000.
Fujitsu Limited: *See*—
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, 4,955,780, Cl. 414-744.200.
Yokoyama, Naoki; and Taguchi, Masao, 4,956,681, Cl. 357-4.000.
Fujiwara, Kazuhiko: *See*—
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.
Fukae, Kensuke; and Kinoshita, Koichi, to Kentek Information Systems, Inc. Electrographic color printer/copier. 4,956,676, Cl. 355-271.000.
Fukuda, Hiroyuki: *See*—
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.
Fukuda, Kazumi: *See*—
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Polyplastics Co., Ltd. Polyarylene thioether composition for molding. 4,956,499, Cl. 524-500.000.
Fukuda, Masatoshi: *See*—
Matsutani, Kanji; and Fukuda, Masatoshi, 4,955,898, Cl. 606-219.000.
Fukuda, Mitsunobu, to Nissan Motor Co., Ltd. Arrangement of electronic antiskid brake system. 4,955,673, Cl. 303-113.000.

Fukumoto, Noriyoshi. Connectors. 4,955,830, Cl. 439-821.000.

Fukuoka, Toshio: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.

Fukushima, Isao: *See*—
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.

Fukushima, Yoichi: *See*—
Fujita, Minoru; and Fukushima, Yoichi, 4,956,215, Cl. 428-64.000.

Fukuzaki, Yasuhiro: *See*—
Murakami, Azuma; and Fukuzaki, Yasuhiro, 4,956,526, Cl. 178-18.000.

Fuller, Elizabeth L.: *See*—
Mason, Stanley I., Jr.; Fuller, Elizabeth L.; and Doty, Roy E., 4,955,617, Cl. 273-256.000.

Fuller, Mark W.; and Robinson, Alan S., to WET Enterprises, Inc. Water displays. 4,955,540, Cl. 239-20.000.

Fuller Research Corporation: *See*—
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., 4,955,689, Cl. 350-96.340.

Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., to Harris Corporation. Method for forming complementary patterns in a semiconductor material while using a single masking step. 4,956,306, Cl. 437-34.000.

Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., to Fuller Research Corporation. IR transmitting optical fiber. 4,955,689, Cl. 350-96.340.

Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, to Adeka Argus Chemical Co., Ltd. Polymer composition. 4,956,407, Cl. 524-120.000.

Furlong, Dennis. Electronic monitoring of ground contact by an athlete's shoes. 4,956,628, Cl. 340-323.00R.

Furukawa Electric Co., Ltd., The: *See*—
Sotani, Junji; and Sasaki, Chiyoshi, 4,955,361, Cl. 126-374.000.

Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, to Sanyo Electric Co., Ltd. Non-aqueous secondary cell. 4,956,248, Cl. 429-194.000.

Furukawa, Yohta: *See*—
Yamaguchi, Kenji; and Furukawa, Yohta, 4,956,795, Cl. 364-571.030.

Furusho, Noboru: *See*—
Kuroda, Masami; Sugata, Yoshinobu; and Furusho, Noboru, 4,956,250, Cl. 430-58.000.
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.

Furuya, Masato: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,956,714, Cl. 358-213.110.

Fusco, Raffaello; Piselli, Fulvio L.; and Boschi, Pier M., to Industria Chimica Profarmaco S.p.A. Process for the preparation of 1-alkyl-3-carboxy-4-cinnolones. 4,956,460, Cl. 544-234.000.

Fusegawa, Izumi: *See*—
Yamagishi, Hirotoshi; Fusegawa, Izumi; Yokota, Shuuji; and Abe, Takao, 4,956,153, Cl. 422-249.000.

Futamura, Yoshihiko: *See*—
Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, 4,956,773, Cl. 364-200.000.

G & W Electric Company: *See*—
Wilk, Robert J., 4,956,525, Cl. 174-152.00R.

Gabus, Georges A.: *See*—
Mock, Elmar; and Gabus, Georges A., 4,956,830, Cl. 368-280.000.

GAF Chemicals Corporation: *See*—
Tazi, Mohammed, 4,956,430, Cl. 526-195.000.

Gage, Gary W.: *See*—
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.

Gagen, Paul F.: *See*—
Freeman, Lucius J.; and Gagen, Paul F., 4,955,976, Cl. 350-96.210.

Gallagher, Bruce C.: *See*—
Kwiatkowski, Richard F.; Gallagher, Bruce C.; and Bicehouse, Jack L., 4,956,606, Cl. 324-207.120.

Gallian, Claude E.: *See*—
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., 4,956,182, Cl. 424-476.000.

Galloway, Bennie E.: *See*—
Staszewski, Edward T.; Reynolds, Steve J.; Vinyard, Richard C.; and Galloway, Bennie E., 4,955,784, Cl. 414-796.400.

Galm, James M.; and Podany, Mark E., to PGM Diversified Industries, Inc. Current density measurement system by self-sustaining magnetic oscillation. 4,956,610, Cl. 324-425.000.

Galmard, Yves: *See*—
Brugere, Robert; Faure, Robert; Galmard, Yves; and Gerentoe, Jacques, 4,955,652, Cl. 294-106.000.

Gandolfi, Carmelo A.: *See*—
Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, 4,956,369, Cl. 514-274.000.

Ganzi, Gary C.: *See*—
Giuffrida, Anthony J.; Ganzi, Gary C.; and Oren, Yoram, 4,956,071, Cl. 204-301.000.

Garavaglia, Carlo: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

Garcera, Daniel; and Gillot, Jacques, to Societe Anonyme dite: Societe des Ceramiques Techniques. Module for rigid cylindrical membrane elements for separation, filtration, or catalytic transformation. 4,956,087, Cl. 210-321.800.

Gard, David R., to Monsanto Company. Method of forming amidophosphates in aqueous solutions. 4,956,163, Cl. 423-302.000.

Gardea, Raymond A., II: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.

Garman, Jonathan D., to Sun Microsystems, Inc. Active fiber for optical signal transmission. 4,955,685, Cl. 350-96.300.

Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., to Melco Industries, Inc. Modular system for use with X-Y peripherals. 4,955,305, Cl. 112-121.110.

Gartner, Margaret C., to Eastman Kodak Company. Priority interrupt during editing mode. 4,956,667, Cl. 355-202.000.

Gas Research Institute: *See*—
Wilkinson, William H., 4,955,205, Cl. 62-94.000.

Gaslock Corporation: *See*—
Pitzen, Terry, 4,955,404, Cl. 137-15.000.

Gate, Hubert; and Huerre, Dominique, to Societe Electronique de la Region Pays de Loire. Connection socket, in particular to connect coaxial plug, with front mounting. 4,955,815, Cl. 439-350.000.

Gates, Louis E., Jr.; and Finnila, Charles A., to Hughes Aircraft Company. Stacked wafer electronic package. 4,956,746, Cl. 361-385.000.

Gates Rubber Company, The: *See*—
Sedlacek, Douglas R., 4,956,036, Cl. 156-137.000.

Gawronski, Richard: *See*—
Coyman, Dennis; and Gawronski, Richard, 4,956,826, Cl. 368-28.000.

Gazeley, Albert E., to Polaroid Corporation. Pivoting optical accessory for use with spectacles. 4,955,707, Cl. 351-47.000.

Gebr. Eickhoff Maschinenfabrik u. EisenieBerei mbH: *See*—
Schupphaus, Herbert, 4,955,668, Cl. 299-42.000.

Gebr. Hofmann GmbH & Co. KG Maschinenfabrik: *See*—
Himmler, Gunther, 4,955,229, Cl. 73-146.000.

GEC-Marconi Limited: *See*—
Samuels, Mark A.; and Dimmick, Stephen, 4,956,873, Cl. 382-54.000.

Geck, Reginald W.: *See*—
Ardell, George G.; Geck, Reginald W.; Jenkins, John M., III; and Sheard, William G., 4,956,426, Cl. 526-60.000.

Geddes, Leslie A.: *See*—
Badylak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., 4,956,178, Cl. 424-551.000.

Geibler, Michael: *See*—
Hausler, Alfons; Ludwig, Rainer; Geibler, Michael; and Jung, Michael, 4,956,216, Cl. 428-64.000.

Geiger, Friedrich, to Passat-Maschinenbau GmbH. Ram press for pressing liquid out of material being pressed. 4,955,214, Cl. 68-242.000.

Geilinger AG: *See*—
Geilinger, Peter; and Keller, Bruno, 4,955,285, Cl. 98-39.100.

Geilinger, Peter; and Keller, Bruno, to Geilinger AG. System for covering the energy requirement of a room. 4,955,285, Cl. 98-39.100.

Geissberger, Arthur E.: *See*—
Griffin, Edward L.; Sadler, Robert A.; and Geissberger, Arthur E., 4,956,308, Cl. 437-41.000.

Geissler, Ulrich; Steppan, Hartmut; and Herwig, Walter, to Hoechst Aktiengesellschaft. Radiation-polymerizable mixture. 4,956,264, Cl. 430-281.000.

Gementi, Francesco; Sogli, Loris; and Ungarelli, Raffaele, to Instituto Guido Donegani S.p.A. Process for producing a silane or siloxane compound containing a cycloalkyl ring. 4,956,484, Cl. 556-410.000.

GenCorp. Inc.: *See*—
White, Woodrow W., 4,956,495, Cl. 562-567.000.

Gendreau, Paul M.; and Cadorniga, Lauro C., to Acushnet Company. Polybutadiene golf ball product. 4,955,613, Cl. 273-218.000.

General Electric Company: *See*—
Dorri, Bizhan; Gross, Dan A.; and Salasoo, Lembit, 4,956,608, Cl. 324-319.000.
Falk, John C.; and Khait, Klementina, 4,956,422, Cl. 525-392.000.
Jackson, Melvin R.; and Huang, Shyh-Chin, 4,956,144, Cl. 420-580.000.
Thompson, Peter H.; and Smalling, Richard J., 4,956,497, Cl. 524-474.000.
Upadhya, Kamleshwar, 4,956,858, Cl. 378-133.000.

General Instrument Corporation: *See*—
Robbins, Clyde; and Schilling, John, 4,956,862, Cl. 380-19.000.

General Mills, Inc.: *See*—
Seaborne, Jonathan, 4,956,533, Cl. 219-10.55E.

General Motors Corporation: *See*—
Albertson, William C., 4,955,350, Cl. 123-533.000.
Bausch, Paul, 4,955,443, Cl. 180-79.100.
Bausch, Paul, 4,955,853, Cl. 475-241.000.
Brown, David B.; and Gonze, Eugene V., 4,955,345, Cl. 123-381.000.

Caracciolo, Anthony, Jr.; Austin, Wayne R.; Zuccaro, Dante C.; and Pomrehn, Leonard P., 4,955,655, Cl. 294-93.000.
Coleman, John R.; and Schubert, Malvin L., 4,955,197, Cl. 60-547.100.
Diwakar, Ramachandra; Krieger, Roger B.; Meintjes, Keith; and Groff, Edward G., 4,955,338, Cl. 123-276.000.
Klomp, Edward D., 4,955,333, Cl. 123-73.0AC.
Mahoney, Christopher J., 4,955,231, Cl. 73-313.000.
Martell, William A.; and Brown, Colin R., 4,955,804, Cl. 425-548.000.
Reinert, Karl A.; and Alcorn, Gary W., 4,955,251, Cl. 74-501.50R.
Reinert, Karl A.; and Rendon, Edmund L., Jr., 4,955,454, Cl. 180-287.000.
Shellhause, Ronald L., 4,955,458, Cl. 188-2.00D.
Spenk, Robert E.; Vazifdar, Pesi A.; and Janowski, John A., Jr., 4,955,304, Cl. 104-296.000.
Trombley, Douglas E.; and Buslepp, Kenneth J., 4,955,341, Cl. 123-339.000.
Way, Terrance, 4,955,524, Cl. 228-182.000.

General Signal Corporation: *See*—
Right, Robert W., 4,956,634, Cl. 340-521.000.
Rutherford, David B., 4,956,779, Cl. 364-426.050.

Genex Corporation: *See*—
Fahnestock, Stephen R., 4,956,296, Cl. 435-252.330.

Genus, John F.: *See*—
McManus, James W.; and Genus, John F., 4,956,490, Cl. 560-051.000.

Geochemical Services, Inc.: *See*—
Henderson, William B., 4,955,717, Cl. 356-316.000.

Georg Knoblauch, Firma: *See*—
Rau, Georg; Hitzler, Werner; and Riess, Gerhard, 4,955,478, Cl. 206-379.000.

George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., to Mark Williams Company. Method for canonical ordering of binary data for portable operating systems. 4,956,809, Cl. 364-900.000.

Georgetown University: *See*—
Talebian, Abdolhossen; Green, Dianna C.; Hammer, Charles F.; and Schein, Philip S., 4,956,459, Cl. 536-121.000.

Gerenton, Jacques: *See*—
Brugere, Robert; Faure, Robert; Galmard, Yves; and Gerenton, Jacques, 4,955,652, Cl. 294-106.000.

Gergen, William P.; Lutz, Robert G.; and Hart, William W.C., to Shell Oil Company. Polymer blend. 4,956,412, Cl. 525-190.000.

Gerhard Collardin GmbH: *See*—
Opitz, Reinhard; and Schellenberg, Lutz, 4,956,016, Cl. 106-14.120.

Gerhard, Helmut, to Westerwaelder Eisenwerk Gerhard GmbH. Transport tank. 4,955,956, Cl. 220-562.000.

Gerke, Steven R.: *See*—
Aubrey, Truman R.; and Gerke, Steven R., 4,956,758, Cl. 362-285.000.

Gerrick, Jack M., to International Bedding Corporation. Removable pillow top for mattress. 4,955,095, Cl. 5-446.000.

Gersdorf, Joachim: *See*—
Schlosser, Hans-Joachim; and Gersdorf, Joachim, 4,956,262, Cl. 430-162.000.

Gerstch, Franck, to Kis Photo Industrie. Device for printing photographs. 4,956,663, Cl. 355-38.000.

Gestra Aktiengesellschaft: *See*—
Foller, Werner; and Klann, Holm, 4,955,536, Cl. 236-48.00R.

Gieschen, John A.: *See*—
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.

Gieseler, Klaus: *See*—
Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Steegmuller, Helmut, 4,955,464, Cl. 198-463.300.

Gil, Gerard: *See*—
Assaldi, Gwenaele; Gil, Gerard; and Le Petit, Jean, 4,956,192, Cl. 426-425.000.

Gilbard, Jeffrey P.; and Dartt, Darlene A., to Eye Research Institute of Retina Foundation. Stimulation of tear secretion with cyclic nucleotides. 4,956,348, Cl. 514-47.000.

Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., to International Flavors & Fragrances Inc. Adamantane derivatives, compositions of matter containing same, processes for preparing said adamantane derivatives and said compositions, and organoleptic and deodorancy uses of said adamantane derivatives and said compositions. 4,956,481, Cl. 549-459.000.

Gilloire, Andre ; and Vetterli, Martin, to ETAT Francais represente par le Ministre des postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications). Echo cancelling device with frequency sub-band filtering. 4,956,838, Cl. 370-32.100.

Gillot, Jacques: *See*—
Garcera, Daniel; and Gillot, Jacques, 4,956,087, Cl. 210-321.800.

Gilroy, Keith; Limon, Gary T.; and Buchicchio, David F., to Bio Clinic Corporation. Anatomically contoured convoluted foam pad. 4,955,096, Cl. 5-464.000.

Giovanni, Dan V.: *See*—
Smith, Wallace B.; and Giovanni, Dan V., 4,956,162, Cl. 423-244.000.

Gipson, Kirk P.; and Guly, Ronald M., to Hewlett-Packard Company. Frequency independent CRT horizontal sweep generator having current feedback and improved pincushion correction circuitry. 4,956,586, Cl. 315-387.000.

Gist-Brocades N.V.: *See*—
De Smet, Marie J., 4,956,285, Cl. 435-126.000.
McLoughlin, Christopher J.; and Himstedt, Ross B., 4,956,386, Cl. 514-503.000.
Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., 4,956,284, Cl. 435-123.000.

Giuffrida, Anthony J.; Ganzi, Gary C.; and Oren, Yoram, to Millipore Corporation. Electrodeionization apparatus and module. 4,956,071, Cl. 204-301.000.

Glaenzer-Spicer: *See*—
Orain, Michel A., 4,955,847, Cl. 464-111.000.

Glazier, Stephen C.: *See*—
Zamba, Gene; and Glazier, Stephen C., 4,955,371, Cl. 128-200.180.

Gleim, Gunter: *See*—
Bohme, Rolf; and Gleim, Gunter, 4,956,615, Cl. 330-288.000.

Gless, Richard D.: *See*—
Kerlinger, Nancy; and Gless, Richard D., 4,956,468, Cl. 548-200.000.

Gless, Richard D., Jr.: *See*—
Robbins, Jeffrey D.; and Gless, Richard D., Jr., 4,956,487, Cl. 558-98.000.

Glick, Dennis; Vale, Nicholas; McDade, Michael; and Vogel, Richard, to White Glove, Inc. Prefabricated car wash distribution and delivery system and method. 4,955,405, Cl. 137-234.600.

Glidden Company, The: *See*—
Hahn, Kenneth G., Jr.; and Kunz, Barbara L., 4,956,401, Cl. 523-310.000.

Gliga, Alexandru S.: *See*—
Carlommagno, William D.; Cummings, Dennis E.; and Gliga, Alexandru S., 4,955,523, Cl. 228-179.000.

Glitsch, Inc.: *See*—
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.

Glowczewski, Thomas, Macomb County; and Carle, Keith B., to Chrysler Corporation. Circuit for determining the crank position of an ignition switch by sensing the voltage across the starter relay control and holding an electronic device in a reset condition in response thereto. 4,955,336, Cl. 123-179.00B.

Glynwed Tubes and Fittings Limited: *See*—
Barfield, Malcolm R., 4,956,138, Cl. 264-129.000.

Gnahn, Guenter: *See*—
Streich, Georg; and Gnahn, Guenter, 4,956,624, Cl. 335-32.000.

Gobert, Jean: *See*—
Cossement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, 4,956,367, Cl. 514-236.200.
Wulfert, Ernst; Gobert, Jean; and Cossement, Eric, 4,956,363, Cl. 514-232.200.

Godbersen, Byron L. Boat trailer pivotal roller keel support assembly. 4,955,778, Cl. 414-534.000.

Godschalx, James: *See*—
Liu, Ming-Biann; Godschalx, James; Ecker, Ernest; and Caldecourt, Alfred, 4,956,442, Cl. 528-205.000.

Goerlich, Dieter: *See*—
Kolodzie, Rainer; Goerlich, Dieter; and Fiola, Roland, 4,955,183, Cl. 60-303.000.

Goetz, Norbert: *See*—
Jahs, Dieter; Becker, Rainer; Goetz, Norbert; and Wuerzer, Bruno, 4,956,003, Cl. 71-92.000.

Gohara, Shinobu: *See*—
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.

Gola, Alberto; and Pessina, Gianluigi, to SGS-Thomson Microelectronics s.r.l. Pilot circuit with integrated circuit with preset firing delay for MOS power transistors. 4,956,570, Cl. 307-570.000.

Goldenberg, Jill F.; and Winston, Roland, to North American Philips Corporation. Illumination system for non-imaging reflective collector. 4,956,759, Cl. 362-297.000.

Goldfarb, Adolph E. Home basketball apparatus. 4,955,605, Cl. 273-15.00A.

Goldstar Co. Ltd.: *See*—
Hong, Sam P., 4,956,712, Cl. 358-198.000.

Goni, Sylvie; Piot, Odile; and Zundel, Jean-Luc, to Rhone-Poulenc Sante, a French Body Corporate. Use of carpipramine for the treatment of anxiety and sleep disorders. 4,956,362, Cl. 514-217.000.

Gonze, Eugene V.: *See*—
Brown, David B.; and Gonze, Eugene V., 4,955,345, Cl. 123-381.000.

Goodale, David L.; and Hess, Bradford K., to Beckman Instruments, Inc. Liquid degassing system. 4,955,992, Cl. 55-160.000.

Goodhue, William D.; Rauschenbach, Kurt; and Wang, Christine A., to Massachusetts Institute of Technology. Two-dimensional surface-emitting laser array. 4,956,844, Cl. 372-44.000.

Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, to Calgene, Inc. Mammalian peptide expression in plant cells. 4,956,282, Cl. 435-69.510.

Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., to Monarch Marking Systems, Inc. Hand-held labeler. 4,956,045, Cl. 156-384.000.

Goodyear Tire & Rubber Company, The: *See*—
Olsen, Roy W.; and Bell, Curtis H., 4,955,411, Cl. 138-109.000.

Goosen, Mattheus F. A.: *See*—
Hommel, Martin; Sun, Anthony M.; and Goosen, Mattheus F. A., 4,956,128, Cl. 264-4.000.

Goran, Leo. Rope fastener. 4,955,750, Cl. 403-306.000.

Gordon, Julian; and Pugh, Charles S. G., to Abbott Laboratories. Lateral flow chromatographic binding assay device. 4,956,302, Cl. 436-161.000.

Gordon, Keith M.; and Hanson, Robert A., to MPB Corporation. Superconducting magnetic bearing. 4,956,571, Cl. 310-90.500.

Gorham, Sammy L.: *See*—
Snyder, David B.; Marquardt, Warren W.; Gorham, Sammy L.; and Lana, Dolores P., 4,956,452, Cl. 530-387.000.

Gorman, Daniel J. Window glaze cleaning. 4,955,924, Cl. 15-103.000.

Gos, Bart. Method for accelerating the aging of distillates. 4,956,194, Cl. 426-592.000.

Gospodarowicz, Denis: *See*—
Baird, Andrew; Bohlen, Peter; Gospodarowicz, Denis; and Ling, Nicholas C., 4,956,455, Cl. 530-399.000.

Goss, Kenneth C, to TRW Inc. Cryptographic method and apparatus for public key exchange with authentication. 4,956,863, Cl. 380-30.000.

Gosselink, Eugene P.; Hardy, Frederick E.; and Trinh, Toan, to Procter & Gamble Company, The. Rinse-added fabric conditioning compositions containing fabric sofening agents and cationic polyester soil release polymers and preferred cationic soil release polymers therefor. 4,956,447, Cl. 528-272.000.

Gotanda, Masakazu: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Goto, Toshio: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.

Gottlieb Guhring KG: *See*—
Reinauer, Josef, 4,955,764, Cl. 408-59.000.

Gottlieb, Milton S.: *See*—
Singh, Narsingh B.; Henningsen, Tom; Mazelsky, Robert; Hopkins, Richard H.; and Gottlieb, Milton S., 4,955,699, Cl. 350-353.000.

Gough, Rex M. K., to Pitney Bowes Inc. Envelope transport means. 4,955,186, Cl. 53-369.000.

Goulter, Victor H. Multi-purpose tool utilizing arms with parallelogram coupling at proximal ends. 4,955,971, Cl. 294-7.000.

Gouzard, Jean P.; and Szabo, Georges, to Compagnie de Raffinage et de Distribution Total France. Improvements to solid granular catalysts, process for their preparation. 4,956,322, Cl. 502-62.000.

Grabe, Gerhard: *See*—
Fischer, Roland; Grabe, Gerhard; and Niemann, Ekkehard, 4,956,685, Cl. 357-30.000.

Graber Industries, Inc.: *See*—
Morris, John F., 4,955,419, Cl. 160-38.000.

Graboyes, Herman. Blank for use in forming a container having a rounded edge. 4,955,531, Cl. 229-182.100.

Gracie, Michael D., Sr.: *See*—
Beer, Jeffrey S.; and Gracie, Michael D., Sr., 4,955,479, Cl. 206-455.000.

Graf, Robert H.: *See*—
Luo, Shiuh J.; Bunick, Frank J.; and Graf, Robert H., 4,956,458, Cl. 536-112.000.

Gramlich, Walter: *See*—
Degner, Dieter; Gramlich, Walter; and Schuster, Ludwig, 4,956,341, Cl. 512-23.000.

Grandini, Angelo: *See*—
Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno, 4,956,625, Cl. 335-290.000.

Grandone, Cass J., to Abbott Laboratories. Locking rack and disposable sample cartridge. 4,956,148, Cl. 422-64.000.

Granquist, Victor M.: *See*—
Cowan, Jack C.; House, Roy F.; and Granquist, Victor M., 4,956,104, Cl. 252-8.551.

Grasso, Robert J., to University of South Florida. Apparatus and methods for performing electrofusion at specific anatomical sites. 4,955,378, Cl. 128-421.000.

Graves, Lee K., to Wickes Manufacturing Company. Automobile foot rest. 4,955,658, Cl. 296-75.000.

Gray, William: *See*—
Chance, Allen; and Gray, William, 4,955,807, Cl. 431-296.000.

Grazia, Alessandro, to I.M.A. Industria Macchine Automatiche S.p.A. Device for forming a pile of blister packs in an upward direction. 4,955,783, Cl. 414-795.000.

Green, Dianna C.: *See*—
Talebian, Abdolhossen; Green, Dianna C.; Hammer, Charles F.; and Schein, Philip S., 4,956,459, Cl. 536-121.000.

Greenberg, Bert. Brassiere with size and configuration adjustment mechanism. 4,955,846, Cl. 450-69.000.

Greenberg, Julie E.: *See*—
Zarek, Patrick M.; Greenberg, Julie E.; and Peterson, Patrick M., 4,956,867, Cl. 381-94.100.

Greenland GmbH & Co. KG: *See*—
von Allworden, Wilhelm, 4,955,188, Cl. 56-341.000.

Greenslade, Joe E. Device for measuring thread minor diameter. 4,955,140, Cl. 33-199.00R.

Griffin, Edward L.; Sadler, Robert A.; and Geisberger, Arthur E., to ITT Corporation. Method of making self-aligned field-effect transistor. 4,956,308, Cl. 437-41.000.

Griffin, Nigel D., to Reed Tool Company Limited. Manufacture of cutting structures for rotary drill bits. 4,956,238, Cl. 428-408.000.

Griffis, Steven C. Method and means for replacing a malfunctioning air filtration unit. 4,955,410, Cl. 139-883.000.

Griffith, Russell W., to Copeland Corporation. Scroll apparatus control. 4,955,795, Cl. 417-44.000.

Griffiths, Gareth: *See*—
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,956,473, Cl. 548-408.000.

Grigo, Ulrich: *See*—
Williams, John L.; Dederichs, Reinhold; Schlak, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.

Grills, Lawrence M.; and Colditz, Eugene F., to Kaiser Aerospace and Electronics Corporation. Method and apparatus for a vacuum assisted toilet system. 4,955,091, Cl. 4-321.000.

Grindmaster Corporation: *See*—
Newnan, Brian D., 4,955,510, Cl. 222-305.000.

Grodzinsky, Eduard Y.: *See*—
Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A., 4,956,056, Cl. 204-129.430.

Groeneweg, Jan W.: *See*—
Staal, Leendert H.; Vis, Jan C.; and Groeneweg, Jan W., 4,956,126, Cl. 260-428.000.

Groff, Edward G.: *See*—
Diwakar, Ramachandra; Krieger, Roger B.; Meintjes, Keith; and Groff, Edward G., 4,955,338, Cl. 123-276.000.

Grohe, Klaus: *See*—
Schriewer, Michael; Grohe, Klaus; and Petersen, Uwe, 4,956,465, Cl. 546-156.000.

Grosjean, Kenith E.: *See*—
Delventhal, Kent A.; and Grosjean, Kenith E., 4,955,763, Cl. 408-40.000.

Gross, Dan A.: *See*—
Dorri, Bizhan; Gross, Dan A.; and Salasoo, Lembit, 4,956,608, Cl. 324-319.000.

Grossi, Benedetto; Ainger, Raymond, III; and Muller, Richard P., to Circon Corporation. System for reducing drag on the movement of an electrode in a resectoscope. 4,955,884, Cl. 606-46.000.

Groth, John E.; Delmore, Martin F.; and Laughlin, Raymond S., to Erico International Corporation. Electrical fixture. 4,955,825, Cl. 439-535.000.

Grover, Wayne D., to Alberta Telecommunications Research Centre. Method and apparatus for self-restoring and self-provisioning communication networks. 4,956,835, Cl. 370-16.000.

Growall, Joseph R. Mountaineering strategy board game. 4,955,618, Cl. 273-258.000.

Gruenberg, Eric, to Apple Computer, Inc. Multiple contact coaxial shell connector. 4,955,828, Cl. 439-668.000.

Grunden, Michael T.; Youtz, Stephen E.; and Mierzwinski, Eugene P., to Hamilton Standard Controls, Inc. Integrated furnace control having ignition switch diagnostics. 4,955,806, Cl. 431-24.000.

Grundy, Gary M.: *See*—
Parsons, Kevin L.; Grundy, Gary M.; and Dunstand, Jacqueline M., 4,955,518, Cl. 224-247.000.

Gruner + Jahr Printing and Publishing Co.: *See*—
Bolanos, Henry; Pizzko, John; and Williams, David M., 4,955,843, Cl. 446-160.000.

Gruppo Lepetit S.p.A.: *See*—
Riva, Ernesto; Denaro, Maurizio; Selva, Enrico; Cassani, Giovanni; and Parenti, Francesco, 4,956,293, Cl. 435-253.200.

Grutza, Bernd: *See*—
Almes, Horst-Dieter; and Grutza, Bernd, 4,955,466, Cl. 198-831.000.

GSI Corporation: *See*—
Karkow, Edward E., 4,956,524, Cl. 174-117.00M.

GTE Laboratories Incorporated: *See*—
Buhrer, Carl F.; Carlsen, W. John; Cousins, Sarah S.; and Bellows, Alfred H., 4,955,686, Cl. 350-96.200.
Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., 4,956,202, Cl. 427-215.000.

GTE Products Corporation: *See*—
Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., 4,956,202, Cl. 427-215.000.

Guan, Shenheng; and Jones, Patrick R., to University of the Pacific. PC-based FT/ICR system. 4,956,788, Cl. 364-498.000.

Gubler, Hans U.: *See*—
Bollinger, Pietro; Gubler, Hans U.; and Schnyder, Jorg, 4,956,381, Cl. 514-443.000.

Guena, Jean; Leost, Jean-Claude; and Meyer, Sylvain, to Etat Francais represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications). Radio system for data transmission with one passive end and station included in such a system. 4,956,645, Cl. 342-361.000.

Guenthner, Richard A.: *See*—
Kolb, Robert E.; Tuckner, Paul F.; and Guenthner, Richard A., 4,956,419, Cl. 525-342.000.

Guggenberger, Erich; and Hoden, Ebbe, to Sunds Defibrator AB. Wire coiling arrangement. 4,955,217, Cl. 72-134.000.

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Gupta, Vishwa N.: *See*—
Lennig, Matthew; Mermelstein, Paul; and Gupta, Vishwa N., 4,956,865, Cl. 381-43.000.
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Gutek, Beth I., to Dow Corning Corporation. UV curable conformal coating with moisture shadow cure. 4,956,221, Cl. 428-142.000.
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Hahn, Carl J., III; and Berman, Arnold L., 4,956,643, Cl. 342-51.000.
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Hain, David A., to NCR Corporation. Sheet handling apparatus. 4,955,964, Cl. 271-225.000.
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Hansch, Ronald V. Vehicle propulsion system. 4,955,832, Cl. 440-9.000.
Hansen, William G., to American Standarad Inc. Capillary tube assembly and method of manufacture. 4,955,210, Cl. 62-511.000.
Hansmann, Johann: *See*—
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Hebrank, John H., to Embrex, Inc. Method and apparatus of distinguishing between live and dead poultry eggs. 4,955,728, Cl. 374-124.000.
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Hefner, John G., to Dow Chemical Company, The. Catalysts prepared from tetrakis(dialkylamide or diarylamide) derivatives of titanium and polymerization of olefins therewith. 4,956,323, Cl. 502-113.000.
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Helmich, Melvin J., to Cooper Industries, Inc. Low emission dual fuel engine and method of operating same. 4,955,326, Cl. 123-27.0GE.
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Chang, Cheng-Cheng, 4,956,749, Cl. 361-414.000.
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Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, 4,955,357, Cl. 125-23.010.
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Hise, Ronnie G., to Westvaco Corporation. Method of alcohol washing brownstock pulp prior to a chlorination bleaching stage. 4,956,048, Cl. 162-60.000.

Hise, Tony: *See*—
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Holler, Mark A.; Tam, Simon M.; and Castro, Hernan A., to Intel Corporation. Adaptive synapse cell providing both excitatory and

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Hollingsworth, Dean E. Storage capsule for surfboard or the like. 4,955,835, Cl. 441-74.000.
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Holmberg, Glenn, to Handelsbolaget Sea-Parator. Liquid filtration device and method using wave motion. 4,956,101, Cl. 210-780.000.
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Homes, Hunter. Portable cooler. 4,955,957, Cl. 220-324.000.
Hommel, Martin; Sun, Anthony M.; and Goosen, Mattheus F. A., to Connaught Laboratories Limited. Droplet generation. 4,956,128, Cl. 264-4.000.
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Traber, Jorg; and Horstmann, Harald, 4,956,361, Cl. 514-217.000.
Horvath, George. Water heater safety fastener. 4,955,573, Cl. 248-313.000.
Hosaka, Akio; and Yamamoto, Akito, to Nissan Motor Company, Limited. Watchdog timer. 4,956,807, Cl. 364-900.000.
Hosokawa, Toshio: *See*—
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, to Siemens Aktiengesellschaft. Differential amplifier having externally controllable power consumption. 4,956,613, Cl. 330-253.000.
Hottmann, Philip F., to Sub-Zero Freezer Company, Inc. Refrigerator leveling system. 4,955,569, Cl. 248-188.200.
Hotwatt Inc.: *See*—
Sayward, Samuel S., Jr., 4,956,544, Cl. 219-335.000.
Houck, Catherine M.: *See*—
Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, 4,956,282, Cl. 435-69.510.
Houriet, John W., Jr.; and Kavanagh, James A., to Merit Industries, Inc. Electronically scored dart game with missed dart detection system. 4,955,967, Cl. 273-372.000.
House, Roy F.: *See*—
Cowan, Jack C.; House, Roy F.; and Granquist, Victor M., 4,956,104, Cl. 252-8.551.
Houston, Theodore W., to Texas Instruments Incorporated. Memory cell with improved single event upset rate reduction circuitry. 4,956,814, Cl. 365-154.000.
Houston, Theodore W., to Texas Instruments Incorporated. Memory cell with increased stability. 4,956,815, Cl. 365-154.000.
Hoya Corporation: *See*—
Nakajima, Yuji; Ishida, Katsunori; and Mochizuki, Masashi, 4,955,705, Cl. 350-642.000.
Hoyda, David L.: *See*—
Streiff, Paul J.; Hoyda, David L.; and Epstein, Edward, 4,956,186, Cl. 426-43.000.
Hoyt, John M.; and Fischer, Joseph, to Quantum Chemical Corporation. Flexible film laminates and packaging. 4,956,210, Cl. 428-35.300.
Hsiao, Wen J. Table lamp adapter system. 4,956,756, Cl. 362-226.000.
Hsu, Chao-Yang: *See*—
Hollstein, Elmer J.; Wei, James T.; and Hsu, Chao-Yang, 4,956,519, Cl. 585-751.000.
HTC Co., Ltd: *See*—
Sakai, Yoshio; and Yamada, Takeshi, 4,955,253, Cl. 74-553.000.
Huang, Pao-Ter: *See*—
Davidson, Donald R.; Huang, Pao-Ter; and Rogers, H. David, 4,955,152, Cl. 38-36.000.
Huang, Shyh-Chin: *See*—
Jackson, Melvin R.; and Huang, Shyh-Chin, 4,956,144, Cl. 420-580.000.
Huang, Sun-Yi: *See*—
Kozakiewicz, Joseph J.; and Huang, Sun-Yi, 4,956,399, Cl. 523-223.000.
Huber, Guntram; and Jahn, Walter, to Daimler-Benz AG. Anchoring of end points of safety belts. 4,955,637, Cl. 280-801.000.
Hubert, Jean-Luc; Chitty, Joseph M.; and Ellett, William A., to Liquid Air Corporation. Process and apparatus for embrittling and subsequently removing an outer protective coating of a pipe or pipeline. 4,956,042, Cl. 156-344.000.
Hubig, Markus: *See*—
Sulzbacher, Horst; and Hubig, Markus, 4,955,587, Cl. 266-156.000.
Hudson, Alice P.: *See*—
Woodward, Fred E.; and Hudson, Alice P., 4,956,106, Cl. 252-390.000.
Hudspith, Derick, to R. G. Barry Corporation. Convertible container. 4,955,469, Cl. 206-45.230.
Huels Aktiengesellschaft: *See*—
Zerpner, Dieter; and Haag, Horst G., 4,956,498, Cl. 524-492.000.
Huerre, Dominique: *See*—
Gate, Hubert; and Huerre, Dominique, 4,955,815, Cl. 439-350.000.
Hug, William F.: *See*—
Otto, Manfred R.; Reed, Edwin A.; and Hug, William F., 4,956,845, Cl. 372-56.000.
Hughes Aircraft Company: *See*—
Gates, Louis E., Jr.; and Finnila, Charles A., 4,956,746, Cl. 361-385.000.
Hughes, Kolleen C.: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
Hughey, Delmar R.: *See*—
Barker, George W.; Crumpler, Michael G.; Peters, James W.; and Hughey, Delmar R., 4,955,216, Cl. 72-10.000.
Hulsewis, Hans: *See*—
Metz, Josef; and Hulsewis, Hans, 4,955,281, Cl. 89-43.010.
Humphries, Darral V.: *See*—
Rolles, Rolf; and Humphries, Darral V., 4,956,140, Cl. 264-280.000.
Hunley, Steven A.; and Ovens, Kevin, to Texas Instruments Incorporated. Temperature compensated bias circuit. 4,956,567, Cl. 307-310.000.
Hunt, Roger B.: *See*—
Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., 4,956,202, Cl. 427-213.000.
Hunt, William R., III: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Sum-

mers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
Hurst, Boyd E.: *See*—
Cahn, Robert P.; and Hurst, Boyd E., 4,956,161, Cl. 423-235.000.
Hurst, Stephen. Forming an end-cap on a filter cartridge. 4,956,089, Cl. 210-484.000.
Husain, Altaf; and Wheaton, Gregory A., to Penzwalt Corporation. Oxidation of thiols, disulfides and thiolsulfonates. 4,956,494, Cl. 562-118.000.
Huss, Albin, Jr.: *See*—
Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, 4,956,075, Cl. 208-120.000.
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
Hyde, George E.: *See*—
Roy, Dhirendra C.; and Hyde, George E., 4,955,827, Cl. 439-595.000.
Hyde, Leo J., to Du Pont (Australia) Ltd. Reinforcing method and means. 4,955,758, Cl. 405-261.000.
Hydes, Paul C.: *See*—
Heffernan, James G.; Hydes, Paul C.; and Picker, Donald H., 4,956,454, Cl. 530-389.000.
Hyndo, Masakatsu: *See*—
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.
I.M.A. Industria Macchine Automatiche S.p.A.: *See*—
Grazia, Alessandro, 4,955,783, Cl. 414-795.000.
I.W. Industries: *See*—
Antoniello, Frank, 4,955,406, Cl. 137-318.000.
Ibrahim, Abdul: *See*—
Scott, Gerald; Al-Malaika, Sahar; and Ibrahim, Abdul, 4,956,410, Cl. 525-73.000.
Ibrahim, Radwan H.: *See*—
Chawan, Dhyaneshwar B.; Merritt, Carleton G.; and Ibrahim, Radwan H., 4,956,190, Cl. 426-269.000.
Ichikawa, Tadaaki: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.
Ichikawa, Yutaka: *See*—
Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.
ICI Americas Inc.: *See*—
Kerlinger, Nancy; and Gless, Richard D., 4,956,468, Cl. 548-200.000.
Robbins, Jeffrey D.; and Gless, Richard D., Jr., 4,956,487, Cl. 558-98.000.
Scher, Herbert B.; and Rodson, Marius, 4,956,129, Cl. 264-4.700.
Woolard, Frank X., 4,956,006, Cl. 71-95.000.
Ickinger, Georg; Fermuller, Willibald; Paugger, Anton; and Pinter, Reinhard, to Sulzer-Escher Wyss GmbH. Apparatus containing a work surface heated with a heat carrier medium. 4,955,268, Cl. 29-130.000.
Ide, Fumito: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamasaka, Osamu; and Sasbayashi, Takeshi, 4,956,673, Cl. 355-245.000.
Idelman, Peter: *See*—
Niasfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.
Idemitsu Kosan Company Limited: *See*—
Tanaka, Masato; and Machida, Shuji, 4,956,418, Cl. 525-330.600.
Ishina, Nobuaki, to Fanuc Ltd. Gas laser device. 4,956,846, Cl. 372-58.000.
Igarashi, Yasuo, to Sumitomo Rubber Industries, Ltd. Low pressure tire. 4,955,417, Cl. 152-454.000.
Igawa, Akihiko: *See*—
Asakura, Masahiro; and Igawa, Akihiko, 4,956,320, Cl. 501-137.000.
Iijima, Nobuo: *See*—
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, 4,955,780, Cl. 414-744.200.
Iio, Satoshi: *See*—
Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, 4,956,317, Cl. 501-92.000.
Iizuka, Yo: *See*—
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
Ijiri, Masaaki: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
Ikeda Bussan Co., Ltd.: *See*—
Mizuno, Hisayoshi; and Nara, Fumio, 4,956,136, Cl. 264-46.600.
Ikeda, Haruo, to Railway Technical Research Institute. Linear motor feeder system. 4,955,303, Cl. 104-292.000.
Ikeda, Hideo; and Ohno, Shigeru, to Fuji Photo Film Co., Ltd. Silver halide color photographic materials. 4,956,269, Cl. 430-505.000.
Ikeda, Masami: *See*—
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.
Ikeda Mohando Company, Ltd.: *See*—
Nohara, Fujio, 4,956,463, Cl. 544-320.000.
Iketani, Kohichi: *See*—
Tanimoto, Yoshio; and Iketani, Kohichi, 4,956,413, Cl. 525-192.000.
Ilzhoefer, Karl-Heinz: *See*—
Renz, Rainer; and Ilzhoefer, Karl-Heinz, 4,955,740, Cl. 403-27.000.
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, to Canon Kabushiki Kaisha. Information recording medium, production process and molding die for substrate therefor. 4,956,214, Cl. 428-64.000.
Imperial Chemical Industries PLC: *See*—
Flett, David S.; and Lloyd, John E., 4,956,520, Cl. 585-815.000.
Jones, Michael E. B.; and Carey, John G., 4,956,266, Cl. 430-325.000.
Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., 4,956,428, Cl. 526-190.000.
Implant Innovations, Inc.: *See*—
Lazzara, Richard J.; and Beaty, Keith D., 4,955,811, Cl. 433-173.000.
Impra, Inc.: *See*—
Della Corna, Linda V.; Farnan, Robert C.; Colone, William M.; and Kowligi, Rajagopal R., 4,955,899, Cl. 623-1.000.
Imta: *See*—
Bonomi, Giovanni B.; and Oldani, Battistino, 4,955,119, Cl. 29-50.000.
Imura, Yutaka, to Mazda Motor Corporation. Front body construction of a vehicle. 4,955,663, Cl. 296-194.000.
INA Bearing Company: *See*—
Behrens, Mark B., 4,955,732, Cl. 384-484.000.
Inada, Toshio: *See*—
Mifune, Hironobu; Inada, Toshio; Ueda, Aki; and Ogura, Yukio, 4,955,691, Cl. 350-162.130.
Inco Limited: *See*—
Bell, James A. E., 4,956,026, Cl. 148-127.000.
Industria Chimica Profarmaco S.p.A.: *See*—
Fusco, Raffaello; Piselli, Fulvio L.; and Boschi, Pier M., 4,956,460, Cl. 544-234.000.
Industrial Equipment & Engineering Company: *See*—
Rahill, Paul F., 4,955,548, Cl. 241-30.000.
Industrial Research Products, Inc.: *See*—
Carlson, Elmer V., 4,956,868, Cl. 381-189.000.
Industrias Salver, S.A. de C.V.: *See*—
Morales, Jorge L., 4,956,234, Cl. 428-36.500.
Ineson, Malcolm P., to M L Douglas Equipment Ltd. Aircraft ground handling tractor. 4,955,777, Cl. 414-426.000.
Infas Institut Fur Angewandte Sozialwissenscheft GmbH: *See*—
Repschlager, Horst; and Riemer, Heinz, 4,956,551, Cl. 250-231.140.
Ingalls, David E. Board game. 4,955,616, Cl. 273-249.000.
Ingersoll-Rand Company: *See*—
Faulkner, Henry B., 4,955,284, Cl. 92-248.000.
Inoue, Masahiro: *See*—
Ueda, Kanji; Haruna, Kazuo; and Inoue, Masahiro, 4,955,998, Cl. 55-16.000.
Inoue, Nobuaki, to Fuji Photo Film Co., Ltd. Silver halide photographic material and method for forming an image. 4,956,257, Cl. 430-264.000.
Inoue, Nobuaki: *See*—
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoseyama, Masakazu, 4,956,263, Cl. 430-264.000.
Inoue, Noriyuki: *See*—
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
Inoue, Seiji; and Tanaka, Seiichi, to Sanshin Kogyo Kabushiki Kaisha. Ignition timing control system for outboard engine. 4,955,831, Cl. 440-1.000.
Inoue, Sunao: *See*—
Higashi, Kazumi; Nakajima, Toshio; Hino, Atsushi; and Inoue, Sunao, 4,955,900, Cl. 623-6.000.
Inoue, Yoshimichi, to Jidosha Kiki Co., Ltd. Check valve insertable into a hose. 4,955,407, Cl. 137-454.200.
Institut Pasteur: *See*—
Chermann, Jean-Claude; Rouquette, Blandine; Rey, Francoise; and Barre-Sinoussi, Francoise, 4,956,292, Cl. 435-235.000.
Institute of Gas Technology: *See*—
Erekson, Erek J.; Lee, Anthony L.; Barone, S. Peter; and Solomon, Irvine J., 4,956,327, Cl. 502-216.000.
Instituto Guido Donegani S.p.A.: *See*—
Gementi, Francesco; Sogli, Loris; and Ungarelli, Raffaele, 4,956,484, Cl. 556-410.000.
Intel Corporation: *See*—
Holler, Mark A.; Tam, Simon M.; and Castro, Hernan A., 4,956,564, Cl. 307-201.000.
International Anasazi, Inc.: *See*—
Biffle, L. Leslie; and Larson, Chad R., 4,956,805, Cl. 364-900.000.
International Bedding Corporation: *See*—
Gerrick, Jack M., 4,955,095, Cl. 5-446.000.
International Business Machines Corporation: *See*—
Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., 4,956,808, Cl. 364-900.000.
Babu, Suryadevara V.; Lu, Neng-Hsing; and Jones, Gerald W., 4,956,197, Cl. 427-39.000.
Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.00F.
Cote, William J.; Ksanta, Carter W.; Leach, Michael A.; and Paulsen, James K., 4,956,313, Cl. 437-203.000.

Crowe, Andrew S.; and Lai, Daniel T., 4,956,806, Cl. 364-900.000.
Dhopeshwarkar, Dhirendra; Hightower, Scott A.; Mathis, Mac A.; and Mehl, John W., 4,956,766, Cl. 364-200.000.
Larky, Steven P.; Lucas, Bruce D.; McCabe, Daniel H.; and Rodgers, Todd K., 4,956,638, Cl. 340-701.000.
Lee, Ho S.; and Schor, Marshall I., 4,956,791, Cl. 364-513.000.
Mahmoud, Issa S., 4,956,022, Cl. 134-41.000.
Sherman, Arthur M.; and Yanker, Peter C., 4,956,810, Cl. 364-900.000.
Shibamiya, Akira; and Zimowski, Melvin R., 4,956,774, Cl. 364-200.000.
Tayler, Gerald E.; and Wagner, Robert E., 4,956,803, Cl. 364-900.000.

International Flavors & Fragrances Inc.: *See*—
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.

International Nautical Supplies, Inc.: *See*—
Ciccone, Frank E., 4,955,309, Cl. 114-230.000.

International Paper Company: *See*—
Blecha, William E.; and Kent, Henry J., 4,955,720, Cl. 356-429.000.

Intevep, S.A.: *See*—
Chavez, Javier, 4,955,440, Cl. 175-371.000.

Inui, Tsuneo: *See*—
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.

Invenomed, Inc.: *See*—
Parker, Robert L.; and Reed, Charles G., 4,955,391, Cl. 128-771.000.

Ippen, Joachim; Baasner, Bernd; Marhold, Albrecht; Kysela, Ernst; Schaller, Klaus; and von Bittera, Miklos, to Bayer Aktiengesellschaft. Antimycotically active substituted 2-aminothiazoles. 4,956,370, Cl. 514-275.000.

Irick, Virgil, Jr.: *See*—
Dwivedi, Ratnesh K.; and Irick, Virgil, Jr., 4,956,319, Cl. 301-127.000.

Irie, Yutaka: *See*—
Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, 4,956,672, Cl. 355-243.000.

Irizarry, Guillermo. Shower curtain operator. 4,955,422, Cl. 160-344.000.

Isaka, Tsutomu; and Ohta, Saburo, to Toyo Boseki Kabushiki Kaisha. Anti-fogging multilayered film and bag produced therefrom for packaging vegetables and fruits. 4,956,209, Cl. 428-35.200.

Iscar Ceramics, Inc.: *See*—
Moskowitz, David; and Porat, Reuven, 4,956,318, Cl. 501-96.000.

Ise, Kiyotaka; and Fujita, Kozo, to Toyota Jidosha Kabushiki Kaisha. Controller for reducing acceleration slippage of a driven wheel. 4,955,448, Cl. 180-197.000.

Ishibashi, Koji: *See*—
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.

Ishida, Katsunori: *See*—
Nakajima, Yuji; Ishida, Katsunori; and Mochizuki, Masashi, 4,955,705, Cl. 350-642.000.

Ishida, Nobumasa: *See*—
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.

Ishida, Tokuji: *See*—
Hamada, Masataka; Ishida, Tokuji; and Adaka, Yasuaki, 4,956,659, Cl. 354-400.000.

Ishida, Tomotoshi: *See*—
Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoshi, 4,956,787, Cl. 364-474.240.

Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, to Fuji Photo Film Co., Ltd. Silver halide photographic material containing a compound capable of releasing a dye. 4,956,263, Cl. 430-264.000.

Ishigaki, Reisaburo, to Terumo Kabushiki Kaisha. Process for preparing iron enriched food products. 4,956,187, Cl. 426-46.000.

Ishiguro, Katsusuke; Hayakawa, Tsuneyasu; and Yokoyama, Nobuyoshi, to Paloma Kogyo Kabushiki Kaisha. Check-valve mechanisms for a pulse combustion apparatus. 4,955,805, Cl. 431-1.000.

Ishihara, Koji: *See*—
Tokuda, Teruhiko; Ishihara, Koji; Maruyama, Masahiko; and Wada, Manabu, 4,955,409, Cl. 137-561.00A.

Ishihara, Kouichiro: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Ishii, Katsumi; and Sasaki, Yasushi, to Tc' Sagami Limited. Apparatus for holding plates. 4,955,649, Cl. 294-1.100.

Ishii, Yoshitaro: *See*—
Sunagawa, Masao; Jyoraku, Fumio; Ishii, Yoshitaro; and Satoo, Susumu, 4,955,105, Cl. 15-323.000.

Ishikawa, Futoshi: *See*—
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.

Ishikawa, Haruyuki: *See*—
Mizuno, Toru; Ishikawa, Haruyuki; and Iwamoto, Takashi, 4,956,594, Cl. 318-568.100.

Ishikawa, Junji: *See*—
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.

Ishikawa, Shizuo: *See*—
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, 4,955,386, Cl. 128-661.090.

Ishikawa, Takahide: *See*—
Kobiki, Michihiro; Yoshida, Masahiro; and Ishikawa, Takahide, 4,956,697, Cl. 357-81.000.

Ishikawa, Takatoshi: *See*—
Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, 4,956,268, Cl. 430-393.000.

Ishikawa, Takeshi: *See*—
Hirata, Mitsuho; Ishikawa, Takeshi; and Shiraishi, Hiroshi, 4,956,052, Cl. 203-19.000.

Ishikawa, Tatatoshi: *See*—
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.

Ismail, Ibrahim A.; and Michaels, David W., to Miles Inc. Test device and method of assaying for fructosamines. 4,956,301, Cl. 436-87.000.

Isoda, Tetsuo: *See*—
Watanabe, Yoichiro; Isoda, Tetsuo; and Aoki, Mitsuo, 4,956,258, Cl. 430-109.000.

Isuzu Ceramics Research Institute Co., Ltd.: *See*—
Kawamura, Hideo, 4,955,199, Cl. 60-608.000.

Isuzu Motors Limited: *See*—
Kawamura, Hideo, 4,955,334, Cl. 123-90.110.
Nishioka, Keiichi; and Hirako, Atsushi, 4,955,453, Cl. 180-287.000.

Itagaki, Hirokazu, to Oki Electric Industry Co., Ltd. Frame memory control system. 4,956,708, Cl. 358-140.000.

Itami, Atsushi: *See*—
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzu, Nobuhiko, 4,956,025, Cl. 148-12.00C.

Ito, Hisao; Nishi, Akio; Miyazawa, Masasi; and Naruse, Masayoshi, to Ajinomoto Company, Inc. Process for isolating and purifying amino acids. 4,956,471, Cl. 548-344.000.

Ito, Koichi: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoshi, to Hitachi, Ltd. Elimination work simulator apparatus. 4,956,787, Cl. 364-474.240.

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Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, 4,956,672, Cl. 355-243.000.

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Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, 4,955,116, Cl. 28-110.000.

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Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.

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Strobl, Georg, 4,956,572, Cl. 310-233.000.

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Josef, Moshe; and Wiesenfeld, David, to Videx-Wire Products (Proprietary) Limited. Rock bolt. 4,955,219, Cl. 72-187.000.
Josefik, John, to Microlift Systems, Incorporated. High pressure oxygen-saturated water treatment apparatus. 4,956,080, Cl. 210-109.000.
Joseph, Brian J., to Eastman Kodak Company. Ribbon blender for a development apparatus with self adjusting inner and outer ribbons. 4,956,675, Cl. 355-251.000.
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Judeinstein, Andre; and Fevrier, Laurent, to LMT Radioprofessionnelle. Method and device for switching a packet of data. 4,956,841, Cl. 370-94.100.
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Rock, Erich, 4,955,160, Cl. 312-340.000.
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Hidaka, Sachio; Shibata, Hiroshi; and Yoshimatu, Hideaki, 4,955,283, Cl. 91-447.000.
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Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fukuo, 4,955,191, Cl. 60-39.300.
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Kah, Carl L. C., Jr. Reversing transmission for oscillating sprinklers. 4,955,542, Cl. 239-242.000.
Kahaney, Alan. Sunglasses having adjustable temples. 4,955,708, Cl. 351-44.000.
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Grilla, Lawrence M.; and Colditz, Eugene F., 4,955,091, Cl. 4-321.000.
Kaiser, Heinz; and Stadelmann, Rudolf, to Heinz Kaiser AG. Boring attachment. 4,955,767, Cl. 408-146.000.
Kaita, Jun: *See*—
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Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory. 4,956,811, Cl. 365-51.000.
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Todd, Paul H., Jr., 4,956,195, Cl. 426-600.000.
Kalder, Dieter: *See*—
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Kaler, Karen V. I. S.; and Jones, Thomas B. Method and apparatus for three dimensional dynamic dielectric levitation. 4,956,065, Cl. 204-183.100.
Kallenbach, Ralph, to Fluor Corporation. Energy damping device. 4,955,467, Cl. 188-381.000.
Kalyandurg, Satyan K., to Eastman Kodak Company. Metering assembly for development apparatus. 4,956,674, Cl. 355-251.000.
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Kametani, Masatsugu, to Hitachi, Ltd. Arithmetic operation processing apparatus of the parallel processing type and compiler which is used in this apparatus. 4,956,800, Cl. 364-736.000.
Kami, Kuniaki: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.
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Kaminskas, Rimvykas A., to TRW Inc. Thrust vector control system for aerospace vehicles. 4,955,559, Cl. 244-52.000.
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Elmore, Carl L.; and Mitchell, Phillip, 4,955,482, Cl. 209-17.000.
Kanagawa, Yoichi: *See*—
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.

Kanda, Takashi: *See*—
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Kane, Robert C., to Motorola, Inc. Switched anode field emission device. 4,956,574, Cl. 313-306.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.

Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, to Mitsubishi Jukogyo K.K. Automatic toll collector for a toll road. 4,955,532, Cl. 232-7.000.

Kaneko, Tetsuya: *See*—
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.

Kaneko, Yoshiyuki: *See*—
Tsukada, Toshihisa; Kaneko, Yoshiyuki; and Sasano, Akira, 4,955,697, Cl. 350-332.000.

Kanemitsu, Nobuhisa: *See*—
Mori, Kiju; and Kanemitsu, Nobuhisa, 4,956,031, Cl. 156-67.000.

Kaneshige, Masatoshi: *See*—
Asanuma, Masato; Kaneshige, Masatoshi; and Aimoto, Toyoka, 4,955,316, Cl. 118-657.000.

Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, to Hitachi, Ltd. Dry etching apparatus. 4,956,043, Cl. 156-345.000.

Kaneyasu, Masayoshi; and Kurihara, Nobuo, to Hitachi, Ltd. Throttle control apparatus of internal combustion engine. 4,955,346, Cl. 123-399.000.

Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., to National University of Singapore. Chemical synthesis of stable and electroactive polypyrrole and related polyheterocyclic compounds. 4,956,444, Cl. 528-220.000.

Kanner, Rowland W.; and Williams, Fred E., Jr., to Ryder International Corporation. Pressure venting system for lens cases. 4,956,156, Cl. 422-300.000.

Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, to NOK Corporation. Process for preparing a magnetic fluid. 4,956,113, Cl. 252-62.520.

Kano, Tetsuhiro. Illumination equipment. 4,956,751, Cl. 362-1.000.

Kansai Electric Power Co., Inc., The: *See*—
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, 4,956,244, Cl. 429-17.000.

Kao Corporation: *See*—
Shirasaki, Yoshitsugu; and Torimoto, Yoshiaki, 4,956,259, Cl. 430-137.000.

Karkow, Edward E., to GSI Corporation. Woven electrical transmission cable. 4,956,524, Cl. 174-117.00M.

Karn, Donald L.: *See*—
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 4,956,045, Cl. 156-384.000.

Karpf, Kurt, to Sulzer Brothers Limited. Prosthetic acetabulum. 4,955,917, Cl. 623-22.000.

Karra, Vijia K.: *See*—
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.

Kasama, Yasuhiro: *See*—
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.

Kaschper, Jurgen R., to Big Creek Sports Ltd. Oar for racing shells and method of making same. 4,955,839, Cl. 440-101.000.

Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., to GTE Products Corporation; and GTE Laboratories Incorporated. Firing and milling method for producing a manganese activated zinc silicate phosphor. 4,956,202, Cl. 427-215.000.

Kaser, Beda, to Zumbach Electronic AG. Process for producing HOE's for use in combination to produce a telecentric beam. 4,955,694, Cl. 350-320.000.

Kashihara, Yuji; Iwatsuki, Kunihiro; and Taga, Yutaka, to Toyota Jidosha Kabushiki Kaisha. Transmission control apparatus, having means for determining the completion of a shifting action of a coupling device with pressure adjusting accumulator. 4,955,256, Cl. 74-866.000.

Kashima, Mitsuhiro; and Suzuki, Kensei, to Kayaba Kogyo Kabushiki Kaisha. Oil-pressure bearing apparatus. 4,955,730, Cl. 38.4-101.000.

Kashiwabuchi, Masaaki: *See*—
Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Kousuke, 4,955,208, Cl. 62-264.000.

Kasler, Karl H.: *See*—
Williams, John L.; Dederichs, Reinhold; Schlak, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.

Kassen, Albert D. Golf club with green surface repair device. 4,955,609, Cl. 273-162.00F.

Katahira, Masayuki, to Nippon Seiko Kabushiki Kaisha. Operating apparatus for clean room. 4,955,244, Cl. 74-89.150.

Kataita, Masafumi: *See*—
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Kataita, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.

Katakura, Kageyoshi: *See*—
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, 4,955,386, Cl. 128-661.090.

Kataoka, Yoshikazu; Wakimoto, Zenji; and Sugata, Takeshi, to Dainippon Screen Mfg. Co., Ltd. Apochromat optical system. 4,955,701, Cl. 350-481.000.

Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, to Mitsubishi Jukogyo Kabushiki Kaisha; and Sumitomo Rubber Industries, Ltd. Metal mold centering and clamping device in a tire vulcanizing machine. 4,955,799, Cl. 425-47.000.

Katayama, Hiroyuki: *See*—
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.

Katayama, Kazuo, to Mazda Motor Corporation. Gear shift device for automotive vehicle. 4,955,935, Cl. 74-473.0SW.

Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., to Cookson Group PLC. Electroconductive copolymers. 4,956,441, Cl. 528-171.000.

Kato, Heizaburo; and Nishioka, Masao, to Sankyo Manufacturing Company, Ltd. Motion transforming apparatus. 4,955,243, Cl. 74-84.00R.

Kato, Heizaburo, to Sankyo Manufacturing Company, Ltd. Eccentricity control device. 4,955,254, Cl. 74-603.000.

Kato, Hideo; Shibata, Hirokumi; Matsushita, Keiko; and Takamatsu, Osamu, to Canon Kabushiki Kaisha. Mask structure for lithography. 4,956,249, Cl. 430-5.000.

Kato, Minoru, to Kabushiki Kaisha Toshiba. Zero crossing type thyristor. 4,956,690, Cl. 357-38.000.

Katoh, Kazunobu: *See*—
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.

Katoh, Shunsaku: *See*—
Ooi, Kenta; Miyai, Yoshitaka; and Katoh, Shunsaku, 4,956,062, Cl. 204-153.150.

Katsumoto, Takehiko: *See*—
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.

Katz, Sol: *See*—
Lienard, Jean; Haesebrouck, Francis; Katz, Sol; Abolins, Andrew; and Schmidt, George, 4,955,144, Cl. 105-4.200.

Kauffman, Thomas F.; and Puletti, Paul P., to National Starch and Chemical Investment Holding Corporation. Bonding method employing sprayable hot melt adhesives for case and carton sealing. 4,956,207, Cl. 428-34.200.

Kaulig, Heinz: *See*—
Stein, Klaus; and Kaulig, Heinz, 4,955,106, Cl. 15-335.000.

Kauss, Wolfgang, to Mannesmann Rexroth GmbH. Hydrostatic auxiliary power steering mechanism for motor vehicles. 4,955,445, Cl. 180-133.000.

Kavanagh, James A.: *See*—
Houriet, John W., Jr.; and Kavanagh, James A., 4,955,967, Cl. 273-372.000.

Kawabata, Tatsuro: *See*—
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, 4,955,780, Cl. 414-744.200.

Kawagoe, Takahiro: *See*—
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, 4,956,247, Cl. 429-194.000.

Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, to Nippon Kayaku Kabushiki Kaisha. Heat-sensitive recording material. 4,956,333, Cl. 503-209.000.

Kawai, Akira: *See*—
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Kawai, Yuzo, to Kabushiki Kaisha Suiden. Suction cleaner. 4,955,107, Cl. 15-339.000.

Kawakami, Yukichika: *See*—
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.

Kawamata, Yoshio; and Iwai, Kiyoshi, to Showa Sangyo Co., Ltd. Method for extracting fats and oils. 4,956,125, Cl. 260-412.800.

Kawamura, Hideaki; Fujibayashi, Kentaro; and Hidaka, Yosato, to Fanuc Ltd. Numerical control method with a parallel processing function. 4,956,785, Cl. 364-474.010.

Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Drive system for turbochargers with rotary electric machines. 4,955,199, Cl. 60-608.000.

Kawamura, Hideo, to Isuzu Motors Limited. Control apparatus for valve driven by electromagnetic force. 4,955,334, Cl. 123-90.110.

Kawana, Yoshie; and Ito, Narushi, to NEC Corporation. Biosensor device provided with an agitator. 4,956,149, Cl. 422-68.100.

Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, to Konica Corporation. Document feeding apparatus. 4,955,595, Cl. 271-9.000.

Kawano, Osamu: *See*—
Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, 4,956,662, Cl. 355-27.000.

Kawarai, Seigi: *See*—
Sueyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, 4,956,220, Cl. 428-141.000.

Kawasaki, Kaoru: *See*—
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzu, Nobuhiko, 4,956,025, Cl. 148-12.00C.

Kawasaki Steel Corporation: *See*—
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.

Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, to Hitachi, Ltd. Refrigerating apparatus having a stink removing device. 4,955,208, Cl. 62-264.000.

Kawashima, Yasumasa: *See*—
Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoshi, 4,956,787, Cl. 364-474.240.

Kawata, Hideaki: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.

Kayaba Kogyo Kabushiki Kaisha: *See*—
Kashima, Mitsuhiro; and Suzuki, Kensei, 4,955,730, Cl. 38.4-101.000.

Kayser, John P., to KLS International Corporation. Lubricating device. 4,955,953, Cl. 184-42.000.

Koch, Fernand J.: *See*—
Lenack, Alain L. P.; and Koch, Fernand J., 4,956,110, Cl. 252-49.500.

Keenan, Bruce S.; and Sparrow, James T. Biological methods utilizing dihydrotestosterone heptanoate. 4,956,357, Cl. 514-178.000.

Keir, John B., to Vickers, Incorporated. Valve system for preventing uncontrolled descent in fork lift trucks. 4,955,461, Cl. 187-9.00R.

Keller, Bruno: *See*—
Geilinger, Peter; and Keller, Bruno, 4,955,285, Cl. 98-39.100.

Keller Industries Ltd.: *See*—
Hahn, Paul; and Allan, James, 4,956,032, Cl. 156-94.000.

Kelley Company Inc.: *See*—
Hageman, Martin P., 4,955,923, Cl. 14-71.700.

Kelly, Eudell L., to Cummins Engine Company, Inc. High compression internal combustion engine. 4,955,337, Cl. 123-193.0CH.

Kelly, Michael C.: *See*—
Williams, David E.; and Kelly, Michael C., 4,955,952, Cl. 181-111.000.

Kelman, Charles D. Decentered intraocular lens. 4,955,902, Cl. 623-6.000.

Kemp, Richard A.: *See*—
Hamilton, David M., Jr.; and Kemp, Richard A., 4,956,516, Cl. 585-646.000.

Kemper, Reinhard: *See*—
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, 4,956,464, Cl. 546-57.000.

Kendig, Robert P.; Lucheta, Roger A.; and McKendree, Francis S., to Westinghouse Electric Corp. Turbine blade fatigue monitor. 4,955,269, Cl. 73-577.000.

Kennametal Inc.: *See*—
Armbrust, William D., 4,955,264, Cl. 82-158.000.
Mehrotra, Pankaj K.; Swiokla, Joyce L.; and Billman, Elizabeth R., 4,956,315, Cl. 501-87.000.

Kennedy, Clinton R.: *See*—
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.

Kennedy, John K.: *See*—
Harris, Meckie T.; Larkin, John J.; Armington, Alton F.; and Kennedy, John K., 4,956,047, Cl. 156-623.00Q.

Kennedy, Ronald C.; Dreesman, Gordon R.; and Essex, Myron, to Southwest Foundation For Biomedical Research; and President and Fellows of Harvard College. Synthetic peptides and method of use for diagnosis and vaccination for AIDS and ARC. 4,956,273, Cl. 435-5.000.

Kenney Manufacturing Company: *See*—
Torti, Anthony, 4,955,421, Cl. 160-243.000.

Kent, Henry J.: *See*—
Blecha, William E.; and Kent, Henry J., 4,955,720, Cl. 356-429.000.

Kentek Information Systems, Inc.: *See*—
Fukae, Kensuke; and Kinoshita, Koichi, 4,956,676, Cl. 355-271.000.

Kenyon, Ian R.; and Smith, Bryan C., to Lever Brothers Company. Composition for softening fabrics: clay softening agent and nonionic surfactant with 0°-15° C. cloudy phase. 4,956,112, Cl. 252-8.900.

Keough, James R.; Miller, Arthur E.; and Schrader, Charles R., to Electro Statics, Inc. Emission control unit. 4,956,152, Cl. 422-181.000.

Kerbstat, Siegfried: *See*—
Beer, Dieter; Reddehase, Horst; Kerbstat, Siegfried; Hanning, Detlef; Plass, Ulrich; and Krause, Hermann, 4,956,747, Cl. 361-392.000.

Kerlinger, Nancy; and Gless, Richard D., to ICI Americas Inc. Process for the acylation of thiazolidines. 4,956,468, Cl. 548-200.000.

Kerze, Joseph E. Stain cleaning method. 4,956,021, Cl. 134-40.000.

Kesler, Herb; and Spector, George. Automatic apparatus for making strudel type pastry. 4,955,801, Cl. 425-92.000.

Keung, Jay K.: *See*—
Ballosi, Ricardo; Donovan, Kevin M.; and Keung, Jay K., 4,956,232, Cl. 428-349.000.

Key, James C.: *See*—
Honeycutt, LeRoy, III; Key, James C.; and Moody, Herbert, III, 4,955,429, Cl. 164-479.000.

Key Manufacturing Group, Inc.: *See*—
Toth, John A., 4,955,773, Cl. 411-429.000.

Khait, Klementina: *See*—
Falk, John C.; and Khait, Klementina, 4,956,422, Cl. 525-392.000.

Khanna, Pyare L.; Dworschack, Robert; and Ruprecht, Phillip, to Microgenics Corporation. Reagent stabilization in enzyme-donor and acceptor assay. 4,956,274, Cl. 435-7.000.

Khapp, Floyd: *See*—
Budde, William A.; and Khapp, Floyd, 4,955,348, Cl. 123-478.000.

Kieda, Shigekazu: *See*—
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.

Kiener, Heinz: *See*—
Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, 4,955,786, Cl. 415-110.000.

Kifer, Edward W.; Wojtyna, V ncent J.; Colton, James P.; and Stickel, Jeffrey T., to Thermal Products International. Closed cell phenolic foam containing alkyl glucosides. 4,956,394, Cl. 521-84.100.

Kikuchi, Yoshinori: *See*—
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.

Kilpatrick, Andrew T.: *See*—
Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, 4,956,365, Cl. 514-233.200.

Kim, Byoung-Chul: *See*—
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, 4,956,396, Cl. 521-85.000.

Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, to Korea Advanced Institute of Science & Technology. Process for preparing rigid polyvinyl chloride structured foams having superiw surface characteristics. 4,956,396, Cl. 521-85.000.

Kim, Peter K.: *See*—
Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, 4,955,993, Cl. 55-16.000.

Kimberly-Clark Corporation: *See*—
Rajala, Gregory J.; and King, Lon M., 4,955,113, Cl. 24-448.000.

Kimpel Rolf-Dieter, to Siemens Aktiengesellschaft. Electromagnetic relay. 4,956,623, Cl. 335-128.000.

KimRick, Inc.: *See*—
Brennan, Richard, Sr., 4,955,592, Cl. 269-68.000.

Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, to Mitsubishi Kinzoku Kabushiki Kaisha. Process for preparing compound metal oxides of yttrium, barium and copper. 4,956,340, Cl. 505-1.000.

Kimura, Etsuji: *See*—
Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, 4,956,159, Cl. 423-135.000.

Kimura, Hideki; and Uda, Shoichi, to Laurel Bank Machines Co., Ltd. Coin wrapping paper feeding apparatus for coin wrapping machine. 4,955,179, Cl. 53-212.000.

Kimura, Hirokazu: *See*—
Fujita, Toshiki; Kimura, Hirokazu; and Yamato, Yoshihiro, 4,955,227, Cl. 73-104.000.

Kimura, Hiroyuki, to Canon Kabushiki Kaisha. Image processing apparatus capable of random mosaic and/or oil-painting-like processing. 4,956,872, Cl. 382-44.000.

Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, to Nippon Shinyaku Co., Ltd. Nootropic agent. 4,956,364, Cl. 514-227.500.

Kimura, Masaki: *See*—
Shibata, Toshihiro; and Kimura, Masaki, 4,956,488, Cl. 558-414.000.

Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, to Mitsubishi Jukogyo Kabushiki Kaisha. Driving linkage device. 4,955,788, Cl. 415-150.000.

Kimura, Misao, to Harada Kogyo Kabushiki Kaisha. Rod antenna. 4,956,647, Cl. 343-901.000.

King, John R., to S&K Enterprises, Inc. Rack beam latch. 4,955,743, Cl. 403-254.000.

King, Lon M.: *See*—
Rajala, Gregory J.; and King, Lon M., 4,955,113, Cl. 24-448.000.

King, Martin J., to Hope Technologies Corp.; and Columbia Technology Corp. Body scrubbing brush apparatus. 4,955,101, Cl. 15-21.100.

King, Simon: *See*—
Smith, Eric O. M.; Fisher, James; and King, Simon, 4,955,626, Cl. 280-87.042.

King, Stephen W.; Fowler, Geoff G.; and Vandenbergh, Peter A., to Microlife Technics, Inc. Method for inhibiting fungi. 4,956,177, Cl. 424-93.000.

Kinnan, Frank R., to Underground Technologies. Self-propelled subsoil penetrating tool system. 4,955,439, Cl. 175-45.000.

Kino, Tohru: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.

Kinoshita, Keichi: *See*—
Johdai, Akiyoshi; Kinoshita, Keichi; Matsui, Toshio; and Yamada, Hirokazu, 4,955,597, Cl. 271-215.000.

Kinoshita, Koichi: *See*—
Fukae, Kensuke; and Kinoshita, Koichi, 4,956,676, Cl. 355-271.000.

Kinoshita, Naoyoshi; and Hatta, Yoshihiko, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having a plurality of developing units each containing two-component developer. 4,955,317, Cl. 118-689.000.

Kinoshita, Yoshihiko, to Honda Giken Kogyo Kabushiki Kaisha. Deceleration sensor having safety catch means. 4,955,638, Cl. 280-806.000.

Kipphan, Helmut; and Loffler, Gerhard, to Heidelberger Druckmaschinen AG. Electronic multimachine operating system for remotely controlling printing machines. 4,955,290, Cl. 101-183.000.

Kirihara, Leslie J.: *See*—
Batishko, Charles R.; Kirihara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., 4,956,558, Cl. 250-461.100.
Kirk, James F.: *See*—
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.
Kirk, Kevin A.: *See*—
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,233, Cl. 428-349.000.
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,241, Cl. 428-516.000.
Kirschner, Jonathan; Snazik, Kenneth G.; and Painley, Gary V., to Coca-Cola Company, The. Orange juice dispensing system. 4,955,507, Cl. 222-65.000.
Kis Photo Industrie: *See*—
Gerstch, Franck, 4,956,663, Cl. 355-38.000.
Kishi, Shinichi: *See*—
Suzuki, Kenji; Hatazawa, Kikuo; and Kishi, Shinichi, 4,956,717, Cl. 358-296.000.
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Goros; and Fujii, Masao, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Partial-boil cooling apparatus for engine. 4,955,327, Cl. 123-41.420.
Kitagawa, Katsuhiko; and Maeda, Takeshi, to Central Glass Company, Limited. Method and apparatus for bending and annealing glass sheets to be laminated. 4,956,001, Cl. 65-107.000.
Kitagishi, Nozomu, to Canon Kabushiki Kaisha. Psuedo format camera. 4,955,715, Cl. 354-155.000.
Kitamura, Koichiro, to Kitamura Machinery Co., Ltd. Bed for a machine tool. 4,955,770, Cl. 409-137.000.
Kitamura Machinery Co., Ltd.: *See*—
Kitamura, Koichiro, 4,955,770, Cl. 409-137.000.
Kitamura, Yutaka: *See*—
Aso, Hiroaki; and Kitamura, Yutaka, 4,955,944, Cl. 123-41.310.
Kitazu, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, to Nitto Denko Corporation. Method for applying mold-releasing agent onto mold surfaces using a mold-releasing sheet. 4,956,132, Cl. 264-39.000.
Kitazawa, Susumu: *See*—
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.
Kitchen, Alonzo G.: *See*—
Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.
Kito, Go: *See*—
Aono, Tetsuya; Suno, Masahiro; and Kito, Go, 4,956,360, Cl. 514-215.000.
Kitou, Kouji; and Onozawa, Makoto, to Hitachi, Ltd. Horizontal deflection-high voltage circuit. 4,956,587, Cl. 315-408.000.
Kitsutaka, Eiji: *See*—
Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kitsutaka, Eiji, 4,955,257, Cl. 74-866.000.
Kivi, Ilkka; Manner, Tapio; Kuvaja, Kari; and Terava, Jorma, to Exel Oy; and Rauma-Repola Oy. Method of forming a joint between a connecting piece and a product formed of composite material, said joint, and said connecting piece for forming said joint. 4,955,970, Cl. 285-149.000.
Kiya, Yukitoshi; and Nakazato, Yasushi, to Ricoh Company, Ltd. Recording sheet transport apparatus. 4,956,678, Cl. 355-318.000.
Klamar, Ed. Pipeline padding system. 4,955,756, Cl. 405-179.000.
Klamer, Reuben B.; Lappen, David I.; Lappen, William A.; and Pardo, Beatriz E. Object sensor for detecting characteristics such as color for games. 4,956,775, Cl. 364-411.000.
Klann, Holm: *See*—
Foller, Werner; and Klann, Holm, 4,955,536, Cl. 236-48.00R.
Klapp, Hartmut, to Jagenberg Aktiengesellschaft. Device for introducing material into containers. 4,955,929, Cl. 53-244.000.
Klassen, Lorraine J. Combination bath tub shelf and bench. 4,955,093, Cl. 4-579.000.
Klein, Edward. Disposable safety medical syringe. 4,955,868, Cl. 604-198.000.
Klimczak, William J.: *See*—
Edwards, Robert R.; and Klimczak, William J., 4,955,996, Cl. 55-302.000.
Kling, Lars-Orjan: *See*—
Johnson, Sten E.; and Kling, Lars-Orjan, 4,956,770, Cl. 364-200.000.
Klinke, Roland: *See*—
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, 4,956,613, Cl. 330-253.000.
Klomp, Edward D., to General Motors Corporation. Variable volume crankcase scavenge control. 4,955,333, Cl. 123-73.0AC.
Klosowski, Jerome M.: *See*—
Chu, Hsien-Kun; Kamis, Russell P.; Klosowski, Jerome M.; and Lower, Loren D., 4,956,435, Cl. 528-17.000.
Klotzer, Wilhelm; Link, Helmut; Mussner, Renate; Schiestl, Werner; and Singewald, Nicolas, to Hoffmann-La Roche Inc. 1,3-disubstituted imidazolium salts. 4,956,470, Cl. 548-337.000.
KLS International Corporation: *See*—
Kayser, John P., 4,955,953, Cl. 184-42.000.
Klun, Thomas P.; Robbins, Aida F.; and Ali, M. Zaki, to Minnesota Mining and Manufacturing Company. Radiation crosslinkable compositions. 4,956,265, Cl. 430-283.000.
Knackstedt, Jack S., to Drazil, Jaromir Vaclav. Connector. 4,955,779, Cl. 414-723.000.
Knauf, Vic C.: *See*—
Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, 4,956,282, Cl. 435-69.310.
Kniest, James N.; and Campbell, Dean D., to Ultrasonic Arrays, Inc. Automatic calibration method for thickness gauges. 4,955,225, Cl. 73-1.00J.
Knight, David J.; Kubik, James M.; and Neal, Brian P., to Allied-Signal Inc.; and Bendix Limited. Compressed gas apparatus. 4,955,994, Cl. 55-163.000.
Knoll, Peter; Konig, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, to Robert Bosch GmbH. Opto-electronic indicating matrix, and indicating device provided therewith. 4,955,698, Cl. 350-336.000.
Knowles, Charlene G. Catamenial appliance. 4,955,875, Cl. 604-331.000.
Kobayashi, Isao: *See*—
Hamada, Yoosuke; Hirai, Hiromu; and Kobayashi, Isao, 4,956,789, Cl. 364-508.000.
Kobayashi, Kenji: *See*—
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.
Kobayashi, Masakazu: *See*—
Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, 4,956,773, Cl. 364-200.000.
Kobayashi, Michihito: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
Kobayashi, Michio: *See*—
Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, 4,956,123, Cl. 260-408.000.
Kobayashi, Shigeotshi, to Clarion Co., Ltd. Engaging structure for a mountable/dismountable electronic apparatus used in a vehicle. 4,955,678, Cl. 312-320.000.
Kobayashi, Yoshiji: *See*—
Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, 4,956,245, Cl. 429-26.000.
Kobiki, Michihiro; Yoshida, Masahiro; and Ishikawa, Takahide, to Mitsubishi Denki Kabushiki Kaisha. Microwave monolithic integrated circuit with heat radiating electrode. 4,956,697, Cl. 357-81.000.
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Koch, Klaus, to Hermann Berstorff Maschinenbau GmbH. Method and apparatus for even heating of products by means of microwaves. 4,956,532, Cl. 219-10.55M.
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Frey, Otto; and Koch, Rudolf, 4,955,908, Cl. 623-17.000.
Frey, Otto; and Koch, Rudolf, 4,955,911, Cl. 623-16.000.
Kochendorfer, Heinrich: *See*—
Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Steegmuller, Helmut, 4,955,464, Cl. 198-463.300.
Koda, Yutaka: *See*—
Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, 4,956,113, Cl. 252-62.520.
Koehmstedt, Paul L.: *See*—
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
Koester, Rita: *See*—
Eierdanz, Horst; Schulz, Paul; von Rybinski, Wolfgang; and Koester, Rita, 4,956,124, Cl. 260-410.000.
Kofman, Anatoly. Padlock. 4,955,932, Cl. 70-39.000.
Koger, Hein S.: *See*—
Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., 4,956,284, Cl. 435-123.000.
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, to Daihen Corporation. Arc spot welding apparatus. 4,956,540, Cl. 219-127.000.
Kohno, Yoshitsugu: *See*—
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Kataita, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.
Kohtani, Yutaka: *See*—
Takimoto, Hiroyuki; Kohtani, Yutaka; and Saitoh, Yoshiyuki, 4,956,726, Cl. 360-27.000.
Koike, Seiichi: *See*—
Sato, Masakazu; Koike, Seiichi; Oikawa, Toshihiro; and Ban, Keisuke, 4,955,121, Cl. 29-888.200.
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, to Canon Denshi Kabushiki Kaisha. Method of producing an exposure blade. 4,956,139, Cl. 264-156.000.
Kojima, Eisuke; Fujimori, Shizuyoshi; and Awano, Katsuya, to Kyorin Pharmaceutical Co., Ltd. Cyclic anthranilic acid derivatives and process for their preparation. 4,956,372, Cl. 514-311.000.
Kojima, Takao; and Ujita, Yasuhiro, to NGK Spark Plug Co., Ltd. Oxygen sensor. 4,956,072, Cl. 204-424.000.
Kojima, Takashi: *See*—
Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, 4,956,392, Cl. 518-712.000.

Kokado, Hiroshi; Takiahima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, to Asahi Kogaku Kogyo Kabushiki Kaisha. Objective driving device for an optical disk apparatus. 4,956,833, Cl. 369-46.000.

Kolb, Robert E.; Tackner, Paul F.; and Guenthner, Richard A., to Minnesota Mining and Manufacturing Company. Fluorine-containing polymers with pendent thioorgano groups and method of making said polymers. 4,956,419, Cl. 525-342.000.

Kolb, Wolfgang; and Albrecht, Ernst, to Pfaff Industriemaschinen GmbH. Device on sewing machines for the transport of work pieces. 4,955,307, Cl. 112-304.000.

Koller, William R. Shield for detailing vehicle tires. 4,955,670, Cl. 301-37.00R.

Kolodzie, Rainer; Goerlich, Dieter; and Fiola, Roland, to Webasto AG Fahrzeugtechnik. Burner for difficult to combust gas mixtures. 4,955,183, Cl. 60-303.000.

Kolts, John H.; and Delzer, Gary A., to Phillips Petroleum Company. Dehydrogenation process and catalyst. 4,956,515, Cl. 585-651.000.

Kolts, John H.: *See*—
Elliott, David J.; and Kolts, John H., 4,956,330, Cl. 502-326.000.

Komeyama, Nobuo, to Koyo Seiko Co., Ltd. Universal joint. 4,955,741, Cl. 403-57.000.

Komoto, Akira, to Shimadzu Corporation. Vibration type force detector. 4,955,240, Cl. 73-862.590.

Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, to Canon Kabushiki Kaisha. Liquid injection recording head with flexible support. 4,956,654, Cl. 346-140.00R.

Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, to Nippondenso Co., Ltd. Electroless copper plating solution. 4,956,014, Cl. 106-1.230.

Kondo, Tetsuo, to Hitachi, Ltd. Method and apparatus for addressee location. 4,956,861, Cl. 379-142.000.

Kondo, Yoshikazu: *See*—
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.

Kondoh, Fumio: *See*—
Takehisa, Fumitaka; Kondoh, Fumio; and Yokoi, Mitsuyoshi, 4,955,424, Cl. 164-72.000.

Kondoh, Kaoru: *See*—
Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, 4,956,245, Cl. 429-26.000.

Kone Oy: *See*—
Rintala, Kari; Paarma, Jyrki; and Sissala, Mikko, 4,955,484, Cl. 209-599.000.

Konica Corporation: *See*—
Hirose, Kimimoto; and Hiramoto, Tsutomu, 4,955,471, Cl. 206-303.000.
Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.
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Konig, Winfried: *See*—
Knoll, Peter; Konig, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, 4,955,698, Cl. 350-336.000.

Konishi, Masataka: *See*—
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.

Kopf, Henry B. Filter plate, filter plate element and filter comprising same. 4,956,085, Cl. 210-231.000.

Kopp, Volker, to C. Ehrensperger AG. Dosage gun. 4,955,544, Cl. 239-304.000.

Korea Advanced Institute of Science & Technology: *See*—
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, 4,956,396, Cl. 521-85.000.

Korea Institute of Science and Technology: *See*—
Yun, Kyung S.; and Cho, Byung W., 4,956,067, Cl. 204-212.000.

Korf Engineering GmbH: *See*—
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Koshiishi, Takaho, to Ricoh Company, Ltd. DC decoupled radio communication system. 4,956,876, Cl. 455-78.000.

Koskimies, Salme: *See*—
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.

Kossatz, Gert; Heine, Wolfgang; Lempfer, Karsten; and Sattler, Heinz, to Fraunhofer Gesellschaft zur Forderund der Angewaadten Forschung E.V. Building panel constructed in layers. 4,955,171, Cl. 52-612.000.

Kosugi, Toshio, to Suzuki Motor Company Ltd. Vehicular back door fitting mechanism. 4,955,659, Cl. 296-146.000.

Kosuzume, Hiroshi: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.

Kotajima, Takao, to Fuji Jukogyo Kabushiki Kaisha. Transfer device of four-wheel-drive vehicle. 4,955,848, Cl. 474-28.000.

Kotani, Hiroaki: *See*—
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.

Kotobuki & Co., Ltd.: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,955,739, Cl. 401-65.000.

Kottke, Mary L.: *See*—
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Kottke, Thomas G.: *See*—
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Kouno, Kazuo: *See*—
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Kowarik, Oskar: *See*—
Hoffmann, Kurt; Oberle, Hans-Dieter; Kraus, Rainer; and Kowarik, Oskar, 4,956,819, Cl. 365-201.000.

Kowligi, Rajagopal R.: *See*—
Della Corna, Linda V.; Farnan, Robert C.; Colone, William M.; and Kowligi, Rajagopal R., 4,955,899, Cl. 623-1.000.

Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzu, Nobuhiko, to Nippon Steel Corporation. Process for producing cold-rolled high strength steel sheet having excellent formability and conversion-treatability. 4,956,025, Cl. 148-12.00C.

Koyama, Toshio: *See*—
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Koyo Seiko Co., Ltd.: *See*—
Komeyama, Nobuo, 4,955,741, Cl. 403-57.000.
Ooishi, Hiroshi, 4,955,446, Cl. 180-143.000.

Kozakiewicz, Joseph J.; and Huang, Sun-Yi, to American Cyanamid Company. Emulsified mannich acrylamide polymers. 4,956,399, Cl. 523-223.000.

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Abe, Masanori; Mase, Syunzo; and Kozuka, Yoshinari, 4,956,607, Cl. 324-244.000.

Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, to Canon Kabushiki Kaisha. Image signal reproducing apparatus. 4,956,725, Cl. 360-14.300.

Kraft General Foods, Inc.: *See*—
Moorman, Charles T., 4,956,176, Cl. 426-478.000.

Krall, Jack: *See*—
Jacobs, Robert S.; and Krall, Jack, 4,956,012, Cl. 75-236.000.

Kramer, Rolf; Lohmann, Alfred; Bieker, Guido; and Budesbender, Herbert, to Waggon Union GmbH. Slider. 4,955,293, Cl. 105-199.300.

Kramer, Ulrich: *See*—
Dellinger, Jurgen; and Kramer, Ulrich, 4,955,958, Cl. 244-213.000.

Kramer-Werke GmbH: *See*—
Friedrich, Karl, 4,955,664, Cl. 296-204.000.

Kranz, Joachim; and Wiesenberger, Alois, to BASF Aktiengesellschaft. Preparation of strong and soft-textured surface coating pigments. 4,956,018, Cl. 106-401.000.

Krarup, Christian: *See*—
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.

Kraus, Rainer: *See*—
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Krause, Hermann: *See*—
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Krcova, Zuzana: *See*—
Sulc, Jiri; Krcova, Zuzana; Smetana, Karel; and Pitrova, Sarka, 4,955,903, Cl. 623-6.000.

Kreidl, Janos; Turcsanyi, Peter; Stefko, Bela; Meszaros nee Brill, Judit; and Bogsch, Erika, to Richter Gedeon Vegyeszeti Gyor Rt. Nitraminodiaryl sulfoxide derivatives, process for their preparation and pharmaceutical and pesticidal compositions containing them. 4,956,007, Cl. 71-103.000.

Kresge, Charles T.: *See*—
Johnson, Ivy D.; Chu, Pochen; and Kresge, Charles T., 4,956,517, Cl. 585-660.000.

Krieger, Roger B.: *See*—
Diwakar, Ramachandra; Krieger, Roger B.; Meintjes, Keith; and Groff, Edward G., 4,955,338, Cl. 123-276.000.

Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, to Tex-Matic ApS. Gripping device for nappy materials. 4,955,656, Cl. 294-100.000.

Kroll, Mark W.; and Pommrehn, Mark R., to Cherne Medical, Inc. Optical fiber reflective signal modulation system. 4,956,877, Cl. 455-605.000.

Krommer, Helmut: *See*—
Weiss, Stefan; Krommer, Helmut; and Neuhauser, Karl-Heinz, 4,956,503, Cl. 564-106.000.

Kross, Robert D., to Alcide Corporation. Topical treatment of genital herpes lesions. 4,956,184, Cl. 424-661.000.

Kroupa, Loretta N., to Dow Corning Corporation. Electrically conductive silicone compositions. 4,956,203, Cl. 427-221.000.

Krug, Gerhard: *See*—
Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, 4,955,644, Cl. 285-333.000.

Krukas, David: *See*—
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Krumholz, Robert. Dustless drywall finisher. 4,955,748, Cl. 401-140.000.

Krupp Industrietechnik GmbH: *See*—
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Krushinski, Joseph H., Jr.: *See*—
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Kubic, Helmut: *See*—
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Kubik, James M.: *See*—
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Kubik, Klaus: *See*—
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Kubo, Kiichiro; and Moryia, Masamichi, to Hitachi, Ltd. Liquid crystal display device. 4,955,695, Cl. 350-331.00R.
Kubo, Masaharu: *See*—
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.
Kubo, Wataru: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Yoshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
Kubo, Yoichiro: *See*—
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Kubota, Akinori: *See*—
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Kubota, Tetsumaru: *See*—
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Kubota, Yoshiya: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, to Mitsubishi Aluminum Co., Ltd. Heat exchanger and method of producing same. 4,955,525, Cl. 228-183.000.
Kudo, Michio, to Nissan Motor Co., Ltd. Vehicle body structure reinforced by cowl member. 4,955,662, Cl. 296-192.000.
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Kuguminato, Hideo: *See*—
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Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, to SKF Kugellagerfabriken GmbH. Drive device for pumps. 4,955,786, Cl. 415-110.000.
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Kupferschmidt, Albert: *See*—
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Kurabe Industrial Co., Ltd.: *See*—
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Kuramoto, Takashi: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Sowa, Takeshi, 4,956,703, Cl. 358-76.000.
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Marcotti, Ettore. Flying disk with retrieving device. 4,955,842, Cl. 446-46.000.
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Matsuura, Isao; Wakatsuki, Akira; and Shida, Yuu, to Sumitomo Chemical Company, Limited. Formable vinyl chloride resin composition for powder molding and method for producing same. 4,956,222, Cl. 428-212.000.

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Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, 4,956,392, Cl. 518-712.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.
Mitsubishi Jukogyo K.K.: *See*—
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, 4,955,788, Cl. 415-150.000.
Onizuka, Masakazu; and Tatani, Atsushi, 4,955,586, Cl. 261-87.000.
Mitsubishi Kasei Corporation: *See*—
Okajima, Taizo; Ootani, Kouichi; and Yamada, Tsutomu, 4,956,015, Cl. 106-3.000.
Mitsubishi Kinzoku Kabsuhiki Kaisha: *See*—
Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, 4,956,340, Cl. 505-1.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, 4,956,159, Cl. 423-135.000.
Mitsubishi Rayon Company, Ltd.: *See*—
Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsugu, 4,956,411, Cl. 528-93.000.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Kataita, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.
Mitsuishi, Yasushi: *See*—
Yamanobe, Takashi; Mitsuishi, Yasushi; and Takasaki, Yoshiyuki, 4,956,291, Cl. 435-200.000.
Mitsuya, Yoshihide: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,955,739, Cl. 401-65.000.
Miura, Kazunobu: *See*—
Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.
Miyagawa, Kazuhisa, to Tel Sagami Limited. Method of heat-processing objects and device and boat for the same. 4,955,808, Cl. 432-5.000.
Miyai, Yoshitaka: *See*—
Ooi, Kenta; Miyai, Yoshitaka; and Katoh, Shunsaku, 4,956,062, Cl. 204-153.150.
Miyajima, Goh, to Hitachi, Ltd. Divisible coil system for NMR imaging apparatus. 4,956,609, Cl. 324-322.000.
Miyake, Akira: *See*—
Sueyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, 4,956,220, Cl. 428-141.000.
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, to Sharp Kabushiki Kaisha. Optical memory element. 4,956,243, Cl. 428-694.000.
Miyaki, Takeo: *See*—
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.
Miyamoto, Koji: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.
Miyanaka, Masaki: *See*—
Honma, Eiichi; Hironaka, Masakazu; Miyanaka, Masaki; Ito, Yutaka; Ookuma, Kuniaki; and Kamiyama, Yoshiteru, 4,955,463, Cl. 198-346.100.
Miyasaka, Tadashi; Matsuda, Akira; Abiru, Toichi; and Machida, Haruhiko, to Yamasa Shoyu Kabushiki Kaisha. 2-alkynyladenosines as antihypertensive agents. 4,956,345, Cl. 514-46.000.
Miyasaka, Toshiyuki, to Kabushiki Kaisha Toshiba. Tracking-deviation detector apparatus capable of preventing overwriting of data on an adjacent track. 4,956,832, Cl. 369-44.110.
Miyatake, Takafumi; and Matsushima, Hitoshi, to Hitachi, Ltd. Method of tracing contour and a system therefor. 4,956,869, Cl. 382-22.000.
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, to Bridgestone Corporation. Nonaqueous electrolyte secondary cell. 4,956,247, Cl. 429-194.000.
Miyazaki, Yasuo; Kamide, Akira; and Watari, Shigeki, to Osaka Bousui Construction Co., Ltd. Method of lining branch pipe portion of underground main pipe with rigid plastics tube. 4,956,041, Cl. 156-267.000.
Miyazawa, Masasi: *See*—
Ito, Hisao; Nishi, Akio; Miyazawa, Masasi; and Naruse, Masayoshi, 4,956,471, Cl. 548-344.000.
Mizota, Masahiro: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.
Mizota, Matao: *See*—
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.
Mizrahi, Sadi: *See*—
Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, 4,956,075, Cl. 208-120.000.
Mizuguchi, Ryuzo: *See*—
Suzuki, Yuji; Urano, Satoshi; Umemoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.
Mizuno, Hisayoshi; and Nara, Fumio, to Ikeda Bussan Co., Ltd. Method of molding skin-covered foamed plastic article. 4,956,136, Cl. 264-46.600.

Mizuno, Toru; Ishikawa, Haruyuki; and Iwamoto, Takashi, to Fanuc Ltd. Method of controlling a robot in accordance with load conditions. 4,956,594, Cl. 318-568.100.
Mladenoff, Donald D.: *See*—
Carver, Larry L.; Zamzow, Charled E.; and Mladenoff, Donald D., 4,956,764, Cl. 364-167.010.
Moberg, Michael K. Versatile writing board. 4,955,576, Cl. 248-449.000.
Mobil Oil Corporation: *See*—
Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, 4,956,075, Cl. 208-120.000.
Ballosi, Ricardo; Donovan, Kevin M.; and Keung, Jay K., 4,956,232, Cl. 428-349.000.
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
Chu, Cynthia T-W., 4,956,514, Cl. 585-533.000.
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,233, Cl. 428-349.000.
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,241, Cl. 428-516.000.
Farng, Lichpao O.; and Horodysky, Andrew G., 4,956,105, Cl. 252-32.70E.
Farng, Lichpao O.; and Horodysky, Andrew G., 4,956,108, Cl. 252-486.000.
Harandi, Mohsen N.; and Owen, Hartley, 4,956,509, Cl. 585-300.000.
Harandi, Mohsen N., 4,956,510, Cl. 585-415.000.
Herrington, Fox J., 4,955,175, Cl. 53-67.000.
Johnson, Ivy D.; Chu, Pochen; and Kresge, Charles T., 4,956,517, Cl. 585-660.000.
Mochida, Ei: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.
Mochida Pharmaceutical Co., Ltd.: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.
Mochizuki, Masashi: *See*—
Nakajima, Yuji; Ishida, Katsunori; and Mochizuki, Masashi, 4,955,705, Cl. 350-642.000.
Mock, Elmar; and Gabus, Georges A., to ETA SA Fabriques d'Ebauches. Watch having a case formed at least partially from a hard material. 4,956,830, Cl. 368-280.000.
Mock-Hecker, Rudiger: *See*—
Knoll, Peter; Konig, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, 4,955,698, Cl. 350-336.000.
Moeller, Charles P., to United States of America, Energy. Waveguide mode converter and method using same. 4,956,620, Cl. 333-21.00R.
Moen, David N.: *See*—
Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., 4,956,808, Cl. 364-900.000.
Molecular Devices Corporation: *See*—
Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, 4,956,275, Cl. 435-7.000.
Molex Incorporated: *See*—
Roberts, James T.; and Silbernagel, Raymond A., 4,955,816, Cl. 439-421.000.
Yamada, Shoji; and Yamada, Tomoo, 4,955,820, Cl. 439-83.000.
Moller, Bynum W. Golf practice device. 4,955,611, Cl. 273-195.00A.
Moltech Invent S.A.: *See*—
Nguyen, Thinh; Lazouni, Abdelkrim; and Doan, Kim S., 4,956,068, Cl. 204-242.000.
Momma, Naohiro: *See*—
Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, 4,956,693, Cl. 357-64.000.
Monarch Marking Systems, Inc.: *See*—
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Winecup, David R., 4,956,045, Cl. 156-384.000.
Monroe Auto Equipment Company: *See*—
Lizell, Magnus B.; and Vanroye, Albert E., 4,955,460, Cl. 188-281.000.
Monsan, Pierre F.: *See*—
Auriol, Daniel H.; Paul, Francois B.; and Monsan, Pierre F., 4,956,489, Cl. 560-40.000.
Monsanto Company: *See*—
Gard, David R., 4,956,163, Cl. 423-302.000.
Montedison S.p.A.: *See*—
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.
Monteith, John R.: *See*—
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Winecup, David R., 4,956,045, Cl. 156-384.000.
Moody, Herbert, III: *See*—
Honeycutt, LeRoy, III; Key, James C.; and Moody, Herbert, III, 4,955,429, Cl. 164-479.000.
Moomaw, David E., to Quaker Oats Company, The. Toy sound-emitting and bubble-blowing saxophone. 4,955,840, Cl. 446-17.000.
Moore Business Forms, Inc.: *See*—
Anderson, Michael W., 4,955,640, Cl. 281-2.000.
Moore, Cheryl L.: *See*—
Adair, Paul C.; and Moore, Cheryl L., 4,956,309, Cl. 430-138.000.
Moore, Daniel S., to Boss Manufacturing & Distributing Inc. Tilting-/removable seat mounting assembly. 4,955,575, Cl. 248-398.000.
Moorman, Charles T., to Kraft General Foods, Inc. Solids-fluid contacting apparatus with screen at fluid outlet. 4,956,176, Cl. 426-478.000.
Moradpour, Alexandre: *See*—
Michel, Philippe; Moradpour, Alexandre; and Penven, Paul, 4,956,508, Cl. 585-26.000.
Morales, Jorge L., to Industrias Salver, S.A. de C.V. Foamed PVC pneumatic ball. 4,956,234, Cl. 428-36.500.
Moreland, Robert D., to Betz PaperChem, Inc. Detackification of adhesive materials contained in secondary fiber using polyvinyl alcohol. 4,956,051, Cl. 162-199.000.
Morgan, William C.: *See*—
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
Mori, Kei. Rainbow forming device. 4,955,975, Cl. 350-96.190.
Mori, Kiju; and Kanemitsu, Nobuhisa, to Stanley Electric Co., Ltd. Method of manufacturing an elongated electroluminescence element. 4,956,031, Cl. 156-67.000.
Mori, Makoto: *See*—
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.
Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, to Takeda Chemical Industries, Ltd. Tricyclic cepham compounds and use. 4,956,358, Cl. 514-202.000.
Morimoto, Hiroyuki: *See*—
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.
Morimoto, Kiyoshi: *See*—
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
Morimoto, Takuo: *See*—
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, to Tokyo Gas Kabushiki Kaisha; and Ashimori Kogyo Kabushiki Kaisha. Method for lining pipe lines. 4,956,038, Cl. 156-156.000.
Morisawa, Kunio, to Toyota Jidosha Kabushiki Kaisha. Planetary gear mechanism having means for accurate alignment of sun gear. 4,955,852, Cl. 475-146.000.
Moriyama, Masahiro, to Sanyo Electric Co., Ltd. Device for continuously driving a tape reel support as a tape is unloaded. 4,956,732, Cl. 360-96.300.
Moriyama, Yuichi: *See*—
Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, 4,955,681, Cl. 313-495.000.
Morris, Daniel P.: *See*—
Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.00F.
Morris, John C.; and Jackson, Winston J., Jr., to Eastman Kodak Company. Copolyesters from 4,4'-biphenyldicarboxylic acid, 1,4-cyclohexanedimethanol, and 1,4-butanediol. 4,956,448, Cl. 528-272.000.
Morris, John F., to Graber Industries, Inc. Foldable valance. 4,955,419, Cl. 160-38.000.
Mortl, Engelbert: *See*—
Zimmer, Johannes; Gutler, Franz; and Mortl, Engelbert, 4,955,298, Cl. 101-120.000.
Moryia, Masamichi: *See*—
Kubo, Kiichiro; and Moryia, Masamichi, 4,955,695, Cl. 350-331.00R.
Mosbey, Deral T., to Minnesota Mining and Manufacturing Company. Wound filling compositions. 4,956,350, Cl. 514-55.000.
Moskowitz, David; and Porat, Reuven, to Iscar Ceramics, Inc. Ceramic cutting tool. 4,956,318, Cl. 501-96.000.
Moslehi, Mehrdad M., to Texas Instruments, Incorporated. Method and apparatus for real-time wafer temperature measurement using infrared pyrometry in advanced lamp-heated rapid thermal processors. 4,956,538, Cl. 219-121.600.
Moss, Nathan S. Anti-theft identification deterrent fastener. 4,955,154, Cl. 40-663.000.
Motohashi, Hiroshi: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
Motoki, Hideo, to Shikoku Kaken Kogyo Co., Ltd. Refractory coating composition. 4,956,013, Cl. 106-675.000.
Motorola, Inc.: *See*—
Bengtson, Dale F., 4,956,854, Cl. 375-111.000.
Kane, Robert C., 4,956,574, Cl. 313-306.000.
Tam, Gordon; Legge, Ronald N.; and Paulson, Wayne M., 4,956,314, Cl. 437-241.000.
Motte, Shunichi: *See*—
Tanaka, Hideo; and Motte, Shunichi, 4,956,680, Cl. 357-4.000.
Mount, Bruce E.; and Becker, Douglas P., to Marquette Gas Analysis. Respiratory CO_2 detector circuit with high quality waveform. 4,955,946, Cl. 128-719.000.

MPB Corporation: *See—*
Gordon, Keith M.; and Hanson, Robert A., 4,956,571, Cl. 310-90.500.

MPD, Inc.: *See—*
Bowlds, Daniel P., 4,956,617, Cl. 331-96.000.

Mucic, Vinko, to TCH Thermo-Consulting-Heidelberg GmbH. Resorptive thermal conversion apparatus. 4,955,931, Cl. 62-238.300.

Muehlenbernd, Thomas; and Hasenbein, Norbert, to BASF Aktiengesellschaft. Preparation of ionically crosslinked ethylene copolymers, ionically crosslinked ethylene copolymers and their use as films, cable sheathing and adhesion promoters. 4,956,414, Cl. 525-196.000.

Muir, William L.: *See—*
Coggins, Peter R.; Mitchell, Andrew L.; Brothers, Paul; and Muir, William L., 4,955,906, Cl. 623-8.000.

Mukai, Kiichiro: *See—*
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.

Mulkey, Dennis. Hunting vest with attached rope. 4,955,456, Cl. 182-3.000.

Mullaly, Peirce J. Head-board recliner using the only one hinge. 4,955,094, Cl. 5-433.000.

Muller, Gottfried; and Hipp, Paul, to Schako Metallwarenfabrik Ferdinand Schad AG. Turbulence outlet. 4,955,286, Cl. 98-40.110.

Muller, Richard P.: *See—*
Grossi, Benedetto; Ainger, Raymond, III; and Muller, Richard P., 4,955,884, Cl. 606-46.000.

Multi-Technology Inc.: *See—*
Jessop, Paul M.; and Jeffs, David H., 4,956,103, Cl. 210-787.000.

Murakami, Azuma; and Fukuzaki, Yasuhiro, to Kabushikikaisha Wacom; and NKK Corporation. Digitizer having flat tablet with magnetic shield plate. 4,956,526, Cl. 178-18.000.

Murakami, Toshifumi: *See—*
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.

Murakami, Yoshiteru: *See—*
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.

Murakawa, Katuhiko: *See—*
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.

Muramatsu, Yukio: *See—*
Yamamoto, Masaki; Hayashi, Hideharu; and Muramatsu, Yukio, 4,956,748, Cl. 361-394.000.

Murata, Akira: *See—*
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Murata, Kazushige: *See—*
Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.

Murata, Tomoji: *See—*
Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, 4,956,672, Cl. 355-243.000.

Murata, Tsuneo, to Kabushiki Kaisha Toshiba. System for reporting status data in a facsimile network. 4,956,860, Cl. 379-100.000.

Murphy, Allen J.: *See—*
Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., 4,955,305, Cl. 112-121.110.

Murphy, James C.: *See—*
Scott, Ernest R.; and Murphy, James C., 4,955,103, Cl. 15-319.000.

Murphy, Wayne H., to Consolidated Rail Corporation. Strapless wheel chocking assembly. 4,955,459, Cl. 188-32.000.

Murphy, William J.; and Engel, Joseph C., to Westinghouse Electric Corp. Solid-state trip unit for DC circuit breakers. 4,956,741, Cl. 361-95.000.

Murray Europe S.p.A.: *See—*
Bona, Alfredo D.; and Airaghi, Attilio, 4,955,643, Cl. 285-190.000.

Musella, Vincenzo; and D'Angelo, Mario, to Nuova Merisinter S.p.A. Process for pretreating metal in preparation for compacting operations. 4,955,798, Cl. 419-31.000.

Mussner, Renate: *See—*
Klotzer, Wilhelm; Link, Helmut; Mussner, Renate; Schiestl, Werner; and Singewald, Nicolas, 4,956,470, Cl. 548-337.000.

Mustatea, Sorin V.: *See—*
Fakoukakis, Emanuel P.; Mustatea, Sorin V.; and Bellmann, Gunter, 4,956,478, Cl. 549-255.000.

Myers, Garry L.; and Wang, Richard H. S., to Eastman Kodak Company. Bis-cyclic phosphite compounds and polymeric materials stabilized therewith. 4,956,406, Cl. 524-119.000.

Naaktgeboren, Adrianus: *See—*
Van Eecke, Roger H.; and Naaktgeboren, Adrianus, 4,955,774, Cl. 414-111.000.

Naderi, Mohammad T. Spectacles for improving binocular vision. 4,955,713, Cl. 351-200.000.

Nadkarni, Vijay J.: *See—*
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., 4,955,689, Cl. 350-96.340.

Nagano, Masashi, to Shimano Industrial Co., Ltd. Front derailleur for use in bicycle. 4,955,849, Cl. 474-80.000.

Nagao, Makoto: *See—*
Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, 4,956,229, Cl. 428-336.000.

Nagasaka, Moritoshi: *See—*
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.

Nagasawa, Kenichi; and Masui, Toshiyuki, to Canon Kabushiki Kaisha. Multi-channel recording and/or reproducing apparatus capable of simultaneously recording and/or reproducing of two channels. 4,956,724, Cl. 360-8.000.

Nagashima, Masasumi: *See—*
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, 4,955,738, Cl. 400-229.000.

Nagata, Keiji: *See—*
Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, 4,955,681, Cl. 313-495.000.

Nagato, Hirokazu: *See—*
Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, 4,956,113, Cl. 252-62.520.

Nagatomo, Masao: *See—*
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Nagel, Hans: *See—*
Harting, Dietmar; Nagel, Hans; and Pape, Gunter, 4,955,819, Cl. 439-79.000.

Nagelberg, Alan S.: *See—*
Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., 4,956,338, Cl. 505-1.000.

Nagoshi, Mitsuru: *See—*
Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.

Nahigian, Stanley H.: *See—*
Carignan, Roger G.; Nahigian, Stanley H.; and Pratt, Clyde R., 4,955,916, Cl. 623-21.000.

Nahrwold, Klaus H., to Rheinmetall GmbH. Apparatus for setting a projectile time fuze. 4,955,279, Cl. 89-6.500.

Naito, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Constant speed holding device. 4,956,778, Cl. 364-426.040.

Naka, Reishi: *See—*
Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Nakada, Junji; and Takeuchi, Hideaki, to Fuji Photo Film Co., Ltd. Sputtering apparatus. 4,956,070, Cl. 204-298.180.

Nakagaki, Shintaro: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,956,714, Cl. 358-213.110.

Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, to Tokyo Kikai Seisakusho Ltd. Web cutting position control system. 4,955,265, Cl. 83-74.000.

Nakagawa, Yutaka: *See—*
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.

Nakai, Eiji: *See—*
Suzuki, Kazuaki; Maruzeni, Shoji; Nakai, Eiji; and Nezu, Toru, 4,956,287, Cl. 435-134.000.

Nakai, Hitoshi: *See—*
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.

Nakai, Masaaki: *See—*
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.

Nakajima, Ikuo: *See—*
Nishiguchi, Toshiji; Okamura, Moriyuki; and Nakajima, Ikuo, 4,955,901, Cl. 623-6.000.

Nakajima, Koji: *See—*
Amataka, Atsushi; Kushida, Kazumitsu; Nakajima, Koji; and Yamamoto, Hitoshi, 4,955,353, Cl. 123-668.000.

Nakajima, Koshiro: *See—*
Nakata, Akio; Yoshida, Masahiro; and Nakajima, Koshiro, 4,955,476, Cl. 206-346.000.

Nakajima, Masakatsu: *See—*
Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, 4,955,116, Cl. 28-110.000.

Nakajima, Masayuki: *See—*
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Nakajima, Sadao, to Hakuto Chemical Co., Ltd. Inhibiting popcorn polymer growth. 4,956,020, Cl. 134-22.190.

Nakajima, Toshio: *See—*
Higashi, Kazumi; Nakajima, Toshio; Hino, Atsushi; and Inoue, Sunao, 4,955,900, Cl. 623-6.000.

Nakajima, Yuji; Ishida, Katsunori; and Mochizuki, Masashi, to Hoya Corporation. Multi-layered back reflecting mirror. 4,955,705, Cl. 350-642.000.

Nakamura, Akio: *See*—
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.

Nakamura, Hiroaki: *See*—
Amazawa, Takao; and Nakamura, Hiroaki, 4,956,204, Cl. 427-248.100.

Nakamura, Ikushi: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.

Nakamura, Koichi, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent and polymerizable compound, and image-forming method employing the same. 4,956,260, Cl. 430-138.000.

Nakamura, Kunie: *See*—
Kakimoto, Norihiro; Kumano, Kazuo; and Nakamura, Kunie, 4,956,272, Cl. 435-1.000.

Nakamura, Masakazu. Fixed focus binocular with visual acuity compensating mechanism. 4,955,702, Cl. 350-556.000.

Nakamura, Minoru, to Minolta Camera Kabushiki Kaisha. Control apparatus for controlling density of toner in a developing unit. 4,956,669, Cl. 355-208.000.

Nakamura, Munekazu: *See*—
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.780.

Nakamura, Taku, to Fuji Photo Film Co., Ltd. Image-forming method employing image-receiving material. 4,956,253, Cl. 430-138.000.

Nakamura, Teruya: *See*—
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.

Nakamura, Tohru: *See*—
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.

Nakamura, Toshihide: *See*—
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,956,331, Cl. 502-339.000.

Nakamura, Youichi: *See*—
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.

Nakanishi, Shingo; and Yamamoto, Susumu, to Aisan Kogyo Kabushiki Kaisha; and Fuji Electric Co., Ltd. Current limiting circuit for fuel pump motor. 4,955,790, Cl. 417-45.000.

Nakano, Mamoru: *See*—
Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, 4,955,357, Cl. 125-23.010.

Nakano, Masaki, to Nissan Motor Co., Ltd. Continuously variable traction roller transmission. 4,955,246, Cl. 74-200.000.

Nakase, Tetsuo: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Nakata, Akio; Yoshida, Masahiro; and Nakajima, Koshiro, to Matsushita Electric Industrial Co., Ltd. Fastener carrier for the support of screw members. 4,955,476, Cl. 206-346.000.

Nakatomi, Hiroshi: *See*—
Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, 4,955,788, Cl. 415-150.000.

Nakayama, Tadayoshi: *See*—
Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, 4,956,725, Cl. 360-14.300.

Nakayama, Takashi, to NEC Corporation. Trigonometric function arithmetic processor using pseudo-division. 4,956,799, Cl. 364-729.000.

Nakazato, Kazuo: *See*—
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.

Nakazato, Yasushi: *See*—
Kiya, Yukitoshi; and Nakazato, Yasushi, 4,956,678, Cl. 355-318.000.

Nakazato, Youichi: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,955,739, Cl. 401-65.000.

Nakazawa, Eiji: *See*—
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Nakazawa, Shinichiro, to Canon Kabushiki Kaisha. Information processing apparatus. 4,955,734, Cl. 400-63.000.

Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, to Fuji Photo Film Co., Ltd. Bleach-fixing solution concentrate composition and method for processing silver halide color photographic materials. 4,956,268, Cl. 430-393.000.

Napadow, Stanley C., to Protectaire Systems Co. Disposable baffle system and method. 4,955,990, Cl. 55-90.000.

Nara, Fumio: *See*—
Mizuno, Hisayoshi; and Nara, Fumio, 4,956,136, Cl. 264-46.600.

Narisue, Shigetoshi: *See*—
Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, 4,955,788, Cl. 415-150.000.

Narita, Yasushi, to Nissan Motor Co., Ltd. Line pressure control arrangement for automatic automotive transmission. 4,955,259, Cl. 74-866.000.

Narula, Anubhav: *See*—
Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.

Naruse, Masayoshi: *See*—
Ito, Hisao; Nishi, Akio; Miyazawa, Masasi; and Naruse, Masayoshi, 4,956,471, Cl. 548-344.000.

Narushima, Masaki; and Takao, Itaru, to Tokyo Electron Limited. Plate-like member receiving apparatus. 4,955,590, Cl. 269-21.000.

Nasu, Atsushi. Process for separating salts in seawater. 4,956,157, Cl. 423-104.000.

National Research Development Corporation: *See*—
de Ronde, Frans C., 4,956,622, Cl. 333-125.000.
Hall, Peter R., 4,955,379, Cl. 128-633.000.

National Rolling Mills, Inc.: *See*—
Platt, William J., 4,955,134, Cl. 29-897.312.

National Semiconductor Corporation: *See*—
Liou, Tian-I; and Teng, Chih-Sieh, 4,956,311, Cl. 437-57.000.

National Space Development Agency of Japan: *See*—
Tsuchihashi, Akira; Noguchi, Naoki; and Kuraoka, Kesatoshi, 4,955,654, Cl. 294-86.400.

National Starch and Chemical Investment Holding Corporation: *See*—
Kauffman, Thomas F.; and Puletti, Paul P., 4,956,207, Cl. 428-34.200.

National University of Singapore: *See*—
Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., 4,956,444, Cl. 528-220.000.

Nauerth, Karl-Heinz: *See*—
Ohnmacht, Helmut; Nauerth, Karl-Heinz; and Meywald, Klaus, 4,956,545, Cl. 219-541.000.

Naya, Junichi: *See*—
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.

NCR Corporation: *See*—
Hain, David A., 4,955,964, Cl. 271-225.000.

Neal, Brian P.: *See*—
Knight, David J.; Kubik, James M.; and Neal, Brian P., 4,955,994, Cl. 55-163.000.

Neale, Douglas L.: *See*—
Blackman, Stephen M.; and Neale, Douglas L., 4,955,527, Cl. 229-114.000.

NEC Corporation: *See*—
Hara, Masanori, 4,956,870, Cl. 382-30.000.
Kawana, Yoshie; and Ito, Narushi, 4,956,149, Cl. 422-68.100.
Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.
Nakayama, Takashi, 4,956,799, Cl. 364-729.000.

NEC Environment Engineering Ltd.: *See*—
Yokoyama, Kenji; and Saizyo, Hidehiko, 4,955,236, Cl. 73-655.000.

NEC Home Electronics Ltd.: *See*—
Ohashi, Mitsuo, 4,956,699, Cl. 358-149.000.

Neches, Philip M., to Teradata Corporation. Methods of selecting simultaneously transmitted messages in a multiprocessor system. 4,956,772, Cl. 364-200.000.

Neher, Paul, to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH. Circular knitting machine for producing single face plush articles. 4,955,211, Cl. 66-9.00R.

Neihold, Daniel A.: *See*—
Barry, Michael, 4,955,168, Cl. 52-210.000.

Neki, Shigeo: *See*—
Sato, Tadashi; and Neki, Shigeo, 4,955,306, Cl. 112-275.000.

Nelles, Lynn P.: *See*—
Harrison, Roger G., Jr.; and Nelles, Lynn P., 4,956,290, Cl. 435-189.000.

Nelson, Isaac H.: *See*—
Henderson, William A.; and Nelson, Isaac H., 4,955,834, Cl. 440-63.000.

Nelson, Robert L.: *See*—
Hood, John K.; Lund, Marlys E.; and Nelson, Robert L., 4,956,297, Cl. 435-292.000.

Nelson, Stanford C. Refuse bag stabilizer. 4,955,496, Cl. 220-1.00T.

Nemoto, Isao; and Yamaoka, Yuji, to Kabushiki Kaisha Iseki Kaihatsu Koki; and Nemoto Kikaku Kogyo K.K. Boring apparatus. 4,955,951, Cl. 166-55.700.

Nemoto Kikaku Kogyo Kabushiki Kaisha: *See*—
Nemoto, Isao; and Yamaoka, Yuji, 4,955,951, Cl. 166-55.700.

Neoh, Koon G.: *See*—
Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., 4,956,444, Cl. 528-220.000.

Neste Oy: *See*—
Nisulolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salia, 4,956,512, Cl. 585-521.000.

Neuhauser, Karl-Heinz: *See*—
Weiss, Stefan; Krommer, Helmut; and Neuhauser, Karl-Heinz, 4,956,503, Cl. 564-106.000.

Neustaedter, Tarl, to Prime Computer, Inc. Method for inter-processor data transfer. 4,956,771, Cl. 364-200.000.

Nevill, David C. E., to Cadbury Schweppes plc. Dispensing of liquids. 4,955,509, Cl. 222-129.400.

Nevyas, Herbert J.; and Loughnane, Michael H., to Diversatronics. Glaucoma needle with a thermal heat band. 4,955,883, Cl. 606-28.000.

Newcomer Products, Inc.: *See*—
Jacobs, Robert S.; and Krall, Jack, 4,956,012, Cl. 75-236.000.

Newkirk, Marc S.: *See*—
Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., 4,956,338, Cl. 505-1.000.
Newman, Marlene. Ant-rub device and method for protecting a horse's coat from damage from a horse blanket. 4,955,182, Cl. 54-79.000.
Newman, Brian D., to Grindmaster Corporation. Bean and ground coffee carrier member for use in coffee systems. 4,955,510, Cl. 222-305.000.
Newton, John: *See*—
Aldcroft, Derek; Newton, John; Quinn, James P.; and Stanier, Peter W., 4,956,167, Cl. 423-339.000.
Nezu, Toru: *See*—
Suzuki, Kazuaki; Maruzeni, Shoji; Naksi, Eiji; and Nezu, Toru, 4,956,287, Cl. 435-134.000.
NGK Insulators, Ltd.: *See*—
Abe, Masanori; Mase, Syunzo; and Kozuka, Yoshinari, 4,956,607, Cl. 324-244.000.
NGK Spark Plug Co., Ltd.: *See*—
Kojima, Takao; and Ujita, Yasuhiro, 4,956,072, Cl. 204-424.000.
Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, 4,956,317, Cl. 501-92.000.
Ngoc Le, Binh, to Merichem Company. Method of impregnating a support material. 4,956,325, Cl. 502-163.000.
Nguyen, Quyen C.; and Hittner, Herman J., to Aluminum Company of America. Stabilization of fluorides of spent potlining by chemical dispersion. 4,956,158, Cl. 423-111.000.
Nguyen, Thinh; Lazouni, Abdelkrim; and Doan, Kim S., to Moltech Invent S.A. Non-consumable anode for molten salt electrolysis. 4,956,068, Cl. 204-242.000.
Nichias Corporation: *See*—
Ashizawa, Masaaki; Nishimoto, Kazuo; and Saito, Hiroshi, 4,956,226, Cl. 428-323.000.
Nicoll, James D. Cluster bin system. 4,955,488, Cl. 211-88.000.
Niekamp, Carl W.: *See*—
White, Dorothy C.; and Niekamp, Carl W., 4,955,364, Cl. 127-63.000.
Niemann, Ekkehard: *See*—
Fischer, Roland; Grabe, Gerhard; and Niemann, Ekkehard, 4,956,685, Cl. 357-30.000.
Nihon Parkerizing Co., Ltd.: *See*—
Saeki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, 4,956,027, Cl. 148-257.000.
Nijhuis, Jozef H. H.: *See*—
Meijer, Egbert W.; Van Vroonhoven, Franciscus C. B. M.; and Nijhuis, Jozef H. H., 4,956,239, Cl. 428-411.100.
Niles, Thomas J., to Polaroid Corporation. Framing apparatus for a medical scanning camera. 4,956,665, Cl. 355-50.000.
Nilssen, Ole K. Flyback converter microwave oven power supply. 4,956,581, Cl. 315-101.000.
Nimmesgern, Hildegard; Weidmann, Klaus; Lang, Hans-Jochen; Rippel, Robert; and Herling, Andreas W., to Hoechst Aktiengesellschaft. Substituted thienoimidazole derivatives, a process for the preparation thereof, pharmaceutical compositions containing them, and the use thereof as inhibitors of gastric acid secretion, as gastroprotectives and as medicaments for intestinal inflammations. 4,956,366, Cl. 514-235.800.
Ninomiya, Masami: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
Ninoyu, Masatoshi: *See*—
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.
Nippon Air Brake Co., Ltd.: *See*—
Ootsuki, Noboru; Tomioka, Katsumi; and Conishi, Toshihiko, 4,955,122, Cl. 29-237.000.
Nippon Ferrofluidics Corporation: *See*—
Yamamura, Akira, 4,955,731, Cl. 384-133.000.
Nippon Fillestar Co., Ltd.: *See*—
Ogawa, Yutaka, 4,955,110, Cl. 17-53.000.
Nippon Kayaku Kabushiki Kaisha: *See*—
Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, 4,956,333, Cl. 503-209.000.
Nippon Kokan Co., Ltd.: *See*—
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.783.
Nippon Oils & Fats Company, Ltd.: *See*—
Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, 4,956,123, Cl. 260-408.000.
Nippon Paint Co., Ltd.: *See*—
Suzuki, Yuji; Urano, Satoshi; Umemoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.
Nippon Pharmaceutical Development Institute Co., Ltd.: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,956,462, Cl. 544-263.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Katahira, Masayuki, 4,955,244, Cl. 74-89.150.
Nippon Seimitsu Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shiraishi, Yasunori, 4,956,227, Cl. 428-331.000.
Shinozaki, Kazushi; and Seki, Shingo, 4,956,034, Cl. 156-102.000.
Nippon Shinyaku Co., Ltd.: *See*—
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Ueoka, Masatoshi; Matsumoto, Syoichi; Yoshida, Hiroshi; and Baba, Masao, 4,956,493, Cl. 560-208.000.
Nippon Steel Corporation: *See*—
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzu, Nobuhiko, 4,956,025, Cl. 148-12.00C.
Nishida, Tokuhiko; and Yamamiya, Masao, 4,956,011, Cl. 75-230.000.
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.
Tanikawa, Keiichi; and Yuzo, Higaki, 4,956,109, Cl. 252-48.600.
Nippon Telegraph and Telephone Corporation: *See*—
Amazawa, Takao; and Nakamura, Hiroaki, 4,956,204, Cl. 427-248.100.
Nippon Zeon Co., Ltd.: *See*—
Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 4,956,417, Cl. 525-327.700.
Miki, Yoshiaki; and Ueda, Tsunehisa, 4,956,183, Cl. 424-630.000.
Nippondenso Co., Ltd.: *See*—
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.
Takehisa, Fumitaka; Kondoh, Fumio; and Yokoi, Mitsuyoshi, 4,955,424, Cl. 164-72.000.
Nishi, Akio: *See*—
Ito, Hisao; Nishi, Akio; Miyazawa, Masasi; and Naruse, Masayoshi, 4,956,471, Cl. 548-344.000.
Nishibe, Takashi; and Yokoyama, Shotaro, to Fuji Electric Co., Ltd. Method and apparatus for aligning image sensors with an optical system in an optical apparatus. 4,956,546, Cl. 250-203.100.
Nishida, Koichi: *See*—
Terai, Kiyohisa; and Nishida, Koichi, 4,956,847, Cl. 372-87.000.
Terai, Kiyohisa; and Nishida, Koichi, 4,956,848, Cl. 372-87.000.
Nishida, Tokuhiko; and Yamamiya, Masao, to Nippon Steel Corporation. Iron-silicon alloy powder magnetic cores and method of manufacturing the same. 4,956,011, Cl. 75-230.000.
Nishiguchi, Toshiji; Okamura, Moriyuki; and Nakajima, Ikuo, to Canon Kabushiki Kaisha. Intraocular implant having coating layer. 4,955,901, Cl. 623-6.000.
Nishikawa, Kinsaku: *See*—
Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, 4,956,446, Cl. 528-272.000.
Nishikawa, Koichiro: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
Nishikawa, Yukio: *See*—
Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, 4,956,539, Cl. 219-121.800.
Nishimoto, Kazuo: *See*—
Ashizawa, Masaaki; Nishimoto, Kazuo; and Saito, Hiroshi, 4,956,226, Cl. 428-323.000.
Nishimoto, Tomiyo: *See*—
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.
Nishina, Edward T.; and Spector, George. Electro motor helicopter. 4,955,560, Cl. 244-53.00R.
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, to Bristol-Myers Company. Polysubstituted thiazolylpyridine carboxyamide antifungal antibiotic. 4,956,374, Cl. 514-342.000.
Nishioka, Keiichi; and Hirako, Atsushi, to Isuzu Motors Limited. Prevention against car burglar. 4,955,453, Cl. 180-287.000.
Nishioka, Masao: *See*—
Kato, Heizaburo; and Nishioka, Masao, 4,955,243, Cl. 74-84.00R.
Nishiuchi, Kihachiro: *See*—
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masuyoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, to Hitachi, Ltd. Pulse doppler flow speed meter. 4,955,386, Cl. 128-661.090.
Nishiyama, Yutaka: *See*—
Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, 4,956,340, Cl. 505-1.000.
Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, 4,956,159, Cl. 423-135.000.
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, to Tohoku Electric Manufacturing Co., Ltd.; and Zaidan Hojin Handotai Kenkyu Sinkokai. Power control apparatus. 4,956,599, Cl. 323-244.000.
Nissan Motor Co., Ltd.: *See*—
Fukuda, Mitsunobu, 4,955,673, Cl. 303-113.000.
Hosaka, Akio; and Yamamoto, Akito, 4,956,807, Cl. 364-900.000.
Jingu, Nobuhisa; and Iwasa, Yoshio, 4,955,335, Cl. 123-90.310.
Kudo, Michio, 4,955,662, Cl. 296-192.000.
Nakano, Masaki, 4,955,246, Cl. 74-200.000.
Narita, Yasushi, 4,955,259, Cl. 74-866.000.

Ogami, Etsuo, 4,955,343, Cl. 123-195.00R.
Oshidari, Toshikazu, 4,955,260, Cl. 74-868.000.
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, to Neste Oy. Procedure for producing poly-alpha-olefine-type lubricants. 4,956,512, Cl. 585-521.000.
Nishin Oil Mills, Ltd., The: *See*—
Tanikawa, Keiichi; and Yuzo, Higaki, 4,956,109, Cl. 252-48.600.
Nitto Denko Corporation: *See*—
Higashi, Kazumi; Nakajima, Toshio; Hino, Atsushi; and Inoue, Sunao, 4,955,900, Cl. 623-6.000.
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.
Nitto Kogyo Co., Ltd.: *See*—
Saito, Shinji, 4,956,211, Cl. 428-36.500.
Niwa, Masatake: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.
NKK Corporation: *See*—
Murakami, Azuma; and Fukuzaki, Yasuhiro, 4,956,526, Cl. 178-18.000.
Noddin, Richard A.: *See*—
Lennox, Charles D.; Noddin, Richard A.; and Sahatjian, Ronald, 4,955,377, Cl. 128-401.000.
Noe, Andreas: *See*—
Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, 4,955,553, Cl. 242-63.000.
Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, to BWG Bergwerk- und Walzwerk-Maschinenbau GmbH. Coiling reel. 4,955,553, Cl. 242-63.000.
Noe, Rolf: *See*—
Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, 4,955,553, Cl. 242-63.000.
Nogrady, Claude B.: *See*—
Sidi, Jean A.; and Nogrady, Claude B., 4,956,768, Cl. 364-200.000.
Noguchi, Naoki: *See*—
Tsuchihashi, Akira; Noguchi, Naoki; and Kuraoka, Kesatoshi, 4,955,654, Cl. 294-86.400.
Noguchi, Noriyoshi: *See*—
Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, 4,956,358, Cl. 514-202.000.
Noguchi, Tamio; and Watanabe, Takaji, to Merck Patent Gesellschaft mit beschrankter Haftung. Novel flaky color pigment and process for producing the same. 4,956,019, Cl. 106-415.000.
Nohara, Fujio, to Ikeda Mohando Company, Ltd. Pyrimidone compound and pharmaceutically acceptable salts thereof. 4,956,463, Cl. 544-320.000.
Nohma, Toshiyuki: *See*—
Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, 4,956,248, Cl. 429-194.000.
Nohr, Henning: *See*—
Krogstrup, Johas; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.
NOK Corporation: *See*—
Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, 4,956,113, Cl. 252-62.520.
Nomoto, Kaoru: *See*—
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.
Nomura, Ichiro: *See*—
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Harahito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.
Nomura, Masaharu: *See*—
Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, 4,956,333, Cl. 503-209.000.
Nomura, Takeshi: *See*—
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.
Nonaka, Nobuyuki: *See*—
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, 4,956,375, Cl. 514-361.000.
Nonaka, Shiro: *See*—
Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoshi, 4,956,787, Cl. 364-474.240.
Norba AB: *See*—
Dahlin, Ingemar, 4,955,776, Cl. 414-525.200.
Nordberg Inc.: *See*—
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.
Norregaard, Thorkild V.: *See*—
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.
Norsk Hydro a.s.: *See*—
Dronnesund, Kjartan; and Stale, Heggo, 4,956,054, Cl. 204-67.000.
North American Dynamics: *See*—
Baldwin, William C., 4,955,280, Cl. 89-33.040.
North American Philips Corporation: *See*—
Goldenberg, Jill F.; and Winston, Roland, 4,956,759, Cl. 362-297.000.
Northern Telecom Limited: *See*—
Lennig, Matthew; Mermelstein, Paul; and Gupta, Vishwa N., 4,956,865, Cl. 381-43.000.
Marks, Robert J.; and Kupferschmidt, Albert, 4,955,829, Cl. 439-719.000.
Northrop Corporation: *See*—
Carver, Larry L.; Zamzow, Charled E.; and Mladenoff, Donald D., 4,956,764, Cl. 364-167.010.
Northwest Marine Technology, Inc.: *See*—
Fralick, Richard D.; and Ekstrom, Philip A., 4,955,396, Cl. 128-898.000.
Norton, Ian T.: *See*—
Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., 4,956,193, Cl. 426-573.000.
Nouvertne, Werner: *See*—
Williams, John L.; Dederichs, Reinhold; Schlak, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.
Novinski, Michael V.; and Patton, Thomas J., to American Home Products Corp. Tablet package having alternative indicators and method of use. 4,955,481, Cl. 206-534.000.
NOWAX s.r.l.: *See*—
Caoduro, Bruno, 4,955,793, Cl. 417-423.110.
Nozaki, Mineo: *See*—
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masatsumi, 4,955,738, Cl. 400-229.000.
Nozomi, Mamoru: *See*—
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.
Nudenberg, Walter: *See*—
Watts, Raymond F.; Loveless, Frederick C.; and Nudenberg, Walter, 4,956,122, Cl. 252-565.000.
Nukui, Masahiro: *See*—
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.
Numakura, Iwao: *See*—
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, to Yamatoya & Co., Ltd. Tonal conversion method for pictures. 4,956,718, Cl. 358-298.000.
Nuova Merisinter S.p.A.: *See*—
Musella, Vincenzo; and D'Angelo, Mario, 4,955,798, Cl. 419-31.000.
Nurminen, Matti: *See*—
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.
Nykoluk, Michael: *See*—
Christie, Craig; and Nykoluk, Michael, 4,955,814, Cl. 439-77.000.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Maury, Hans-Dietmar; and Buslowski, Wolfgang, 4,955,986, Cl. 432-14.000.
Oakley, David; and Hellmer, Michael J., to Megatek Corporation. Adaptive graphics video standards format converter user-interface. 4,956,707, Cl. 358-140.000.
Obereigner, Blahoslav: *See*—
Vacik, Jiri; Obereigner, Blahoslav; and Souckova, Dana, 4,956,432, Cl. 526-264.000.
Oberle, Hans-Dieter: *See*—
Hoffmann, Kurt; Oberle, Hans-Dieter; Kraus, Rainer; and Kowarik, Oskar, 4,956,819, Cl. 365-201.000.
Occidental Chemical Corporation: *See*—
Lee, Chung J., 4,956,423, Cl. 525-432.000.
Lee, Chung J., 4,956,437, Cl. 528-26.000.
Ochiai, Kiyoshi: *See*—
Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshikawa, Hideaki, 4,955,416, Cl. 152-454.000.
Ochs, Siegfried: *See*—
Hilburger, Walter; and Ochs, Siegfried, 4,955,449, Cl. 180-197.000.
O'Connor, Chadwell; and Johnson, Joel W., to Q-CO Industries, Inc. Panhead for camera. 4,955,568, Cl. 248-183.000.
O'Connor, Sean P., to BP Chemicals Limited. Lubricating composition containing anti-wear/extreme pressure additives. 4,956,118, Cl. 544-240.000.
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, to Mitsubishi Chemical Industries Limited. N-indanyl carboxamide derivative and agricultural/horticultural fungicide containing the derivative as active ingredient. 4,956,375, Cl. 514-361.000.
O'Dea, Kevin J.; and McDermott, Francis E., to Pitney Bowes Inc. Mail handling machine with mis-sealed envelope detector. 4,955,483, Cl. 209-548.000.
Office National d'Etudes et de Recherche Aerospatiales (ONERA): *See*—
Appel, Jean, 4,956,874, Cl. 382-56.000.
Ogami, Etsuo, to Nissan Motor Co., Ltd. Cylinder block. 4,955,343, Cl. 123-195.00R.
Ogasawara, Takashi: *See*—
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.
Ogashi, Yoshihiro, to Kabushiki Kaisha Toshiba. Variable speed drive system. 4,956,596, Cl. 318-801.000.

Ogata, Koji: *See*—
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.

Ogawa, Hiroyuki: *See*—
Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, 4,955,116, Cl. 28-110.000.

Ogawa, Syozo: *See*—
Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Ogawa, Toshio: *See*—
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, 4,955,386, Cl. 128-661.090.

Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, to Nippon Steel Corporation; and Finetec Co., Ltd. Heat-generating material for portable hair curler. 4,955,360, Cl. 126-263.000.

Ogawa, Yutaka, to Nippon Fillestar Co., Ltd. Apparatus for collecting roe. 4,955,110, Cl. 17-53.000.

Ogino, Nobuyoshi: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.

Ogino, Takao: *See*—
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, 4,956,247, Cl. 429-194.000.

Ogoh, Ikuo: *See*—
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.

Ogren, Axel E. Fifth wheel activated trailer steering. 4,955,630, Cl. 280-419.000.

Ogura, Shigeru: *See*—
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.

Ogura, Yukio: *See*—
Mifune, Hiroseobu; Inada, Toshio; Ueda, Aki; and Ogura, Yukio, 4,955,691, Cl. 350-162.130.

Ogushi, Tetsuya, to Kagoshima University. Nb-Si-Al-O superconductors with high transition temperatures and process for manufacturing the same. 4,956,337, Cl. 505-1.000.

Ohara, Junryou: *See*—
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, 4,955,237, Cl. 73-784.000.

Ohashi, Mitsuo, to NEC Home Electronics Ltd. Signal synchronizing system. 4,956,699, Cl. 358-149.000.

Ohba, Akio, to Sony Corporation. Apparatus for processing image. 4,956,706, Cl. 358-93.000.

Ohio Medical Instrument Company, Inc.: *See*—
Carol, Mark P., 4,955,891, Cl. 606-130.000.

Ohkase, Wataru; and Sato, Seishiro, to Tel Sagami Limited. Semiconductor wafer treating apparatus. 4,955,775, Cl. 414-152.000.

Ohki, Nobutaka: *See*—
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.

Ohnaka, Kiyoshi; Tsujii, Hiraaki; Sasai, Yoichi; and Shibata, Jun, to Matsushita Electric Industrial Co., Ltd. Optoelectronic integrated circuit. 4,956,682, Cl. 357-16.000.

Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, to Mochida Pharmaceutical Co., Ltd. Intermediates of cephalosporin compounds. 4,956,474, Cl. 548-475.000.

Ohnishi, Hiroshi: *See*—
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.

Ohnmacht, Helmut; Nauerth, Karl-Heinz; and Meywald, Klaus, to Fritz Eichenauer GmbH & Co. KG. Heater with tap. 4,956,545, Cl. 219-541.000.

Ohno, Hiroyuki: *See*—
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.

Ohno, Shigeru: *See*—
Ikeda, Hideo; and Ohno, Shigeru, 4,956,269, Cl. 430-505.000.

Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotu; and Hirayama, Masayoshi, to Hitachi, Ltd. Full automatic electric washing machine having an auto-off power source structure. 4,955,213, Cl. 68-12.00R.

Ohsugi, Hitoshi: *See*—
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.

Ohta, Hirotake, to Taiyo Kikai Ltd. Web printing press with replaceable print unit. 4,955,299, Cl. 101-143.000.

Ohta, Kenji: *See*—
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.

Ohta, Saburo: *See*—
Isaka, Tsutomu; and Ohta, Saburo, 4,956,209, Cl. 428-35.200.

Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, to Mitsubishi Chemical Industries Limited. Photosensitive member for electrophotography. 4,956,256, Cl. 430-96.000.

Ohtsuki, Kenichi: *See*—
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.

Ohuchida, Shuichi: *See*—
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.

Oikawa, Toshihiro: *See*—
Sato, Masakazu; Koike, Seiichi; Oikawa, Toshihiro; and Ban, Keisuke, 4,955,121, Cl. 29-888.200.

Oji Paper Co., Ltd.: *See*—
Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, 4,956,332, Cl. 503-209.000.

Oka, Kunihiko; and Unoki, Hiromi, to Agency of Industrial Science and Technology. Method for preparing a single crystal of lanthanum cuprate. 4,956,334, Cl. 505-1.000.

Okada, Hisashi: *See*—
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.

Okada, Kazuo: *See*—
Seya, Masatomo; Okada, Kazuo; Yoshimura, Motomu; and Maeda, Mitsuo, 4,956,812, Cl. 365-119.000.
Seya, Masatomo; and Okada, Kazuo, 4,956,813, Cl. 365-127.000.

Okada, Toshihiko: *See*—
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.

Okajima, Taizo; Ootani, Kouichi; and Yamada, Tsutomu, to Mitsubishi Kasei Corporation. Polishing composition. 4,956,015, Cl. 106-3.000.

Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fukuo, to Kabushiki Kaisha Toshiba. Combustor for gas turbine. 4,955,191, Cl. 60-39.300.

Okamoto, Shoji: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.

Okamura Corporation: *See*—
Abe, Taizo, 4,955,294, Cl. 108-6.000.

Okamura, Moriyuki: *See*—
Nishiguchi, Toshiji; Okamura, Moriyuki; and Nakajima, Ikuo, 4,955,901, Cl. 623-6.000.

Oki Electric Industry Co., Ltd.: *See*—
Itagaki, Hirokazu, 4,956,708, Cl. 358-140.000.

Oki, Toshikazu: *See*—
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.

Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, to Canon Kabushiki Kaisha. Image sensing device having a photometric element for setting an exposure condition for the image sensing device. 4,956,715, Cl. 358-213.190.

Okuda, Isao: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.

Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, to Fujisawa Pharmaceutical Co., Ltd. Tricyclo compounds, a process for their production and a pharmaceutical composition containing the same. 4,956,352, Cl. 514-63.000.

Okumura, Yoshinori: *See*—
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.

Okuno, Akiyasu: *See*—
Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, 4,956,317, Cl. 501-92.000.

Okunuki, Masahiko: *See*—
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.

Oldani, Battistino: *See*—
Bonomi, Giovanni B.; and Oldani, Battistino, 4,955,119, Cl. 29-50.000.

O'Lenick, Anthony J., Jr.: *See*—
Friel, Thomas C., Jr.; and O'Lenick, Anthony J., Jr., 4,956,119, Cl. 252-358.000.

Olesen, John; and Jorgensen, Jorgen, to Roblon A/S. Method of manufacturing a cable-like plastic composite body. 4,956,039, Cl. 156-180.000.

Olin Corporation: *See*—
Polan, Ned W.; Smialek, Raymond J.; and Menkin, Paul, 4,956,053, Cl. 204-13.000.

Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, to SGS-Thomson Microelectronics S.R.L. CMOS logic circuit for high voltage operation. 4,956,569, Cl. 307-443.000.

Olschewski, Armin: *See*—
Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, 4,955,786, Cl. 415-110.000.

Olsen, Roy W.; and Bell, Curtis H., to Goodyear Tire & Rubber Company, The. Hose having index mark. 4,955,411, Cl. 138-109.000.

Olympic Machines, Inc.: *See*—
Paulos, Harry D., 4,955,982, Cl. 404-11.000.

Olympus Optical Co., Ltd.: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

OM Industrial Co., Ltd.: *See—*
Seiichi, Takatsuka; and Kyokuichi, Sato, 4,955,950, Cl. 141-46.000.

Oma, Kenton H.: *See—*
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehnstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.

Omron Corporation: *See—*
Masuo, Yoshihisa, 4,955,980, Cl. 374-185.000.

Omron Tateisi Electronics Co.: *See—*
Tasaki, Hisashi; and Endo, Kimikazu, 4,956,721, Cl. 358-402.000.

On-Guard Systems, Inc.: *See—*
Steiner, Eric L.; and Sable, Arthur J., 4,955,865, Cl. 604-192.000.

Onaka, Junji: *See—*
Hiraoka, Eiichi; and Onaka, Junji, 4,955,498, Cl. 220-3.000.

Onga, Takeo: *See—*
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Suwa, Takeshi, 4,956,703, Cl. 358-76.000.

Onishi, Masayoshi: and Ozawa, Hiromasa, to Mitsubishi Denki Kabushiki Kaisha. Motor-driven control apparatus. 4,955,954, Cl. 192-0.02R.

Onishi, Masayuki: *See—*
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.

Onishi, Shinji: *See—*
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.

Onizuka, Masakazu: and Tatani, Atsushi, to Mitsubishi Jukogyo Kabushiki Kaisha. Apparatus for treating slurry by gas-liquid contact method. 4,955,586, Cl. 261-87.000.

Onnegren, Jan: *See—*
Braunisch, Eckart; and Onnegren, Jan, 4,956,531, Cl. 219-10.55B.

Ono, Haruhito: *See—*
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.

Ono Pharmaceutical Co., Ltd.: *See—*
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.

Ono, Toyoichi: *See—*
Hashimoto, Haruo; and Ono, Toyoichi, 4,955,447, Cl. 180-168.000.

Onozato, Takashi, to Alps Electric Co., Ltd. Pen selection mechanism for a printer. 4,956,652, Cl. 346-139.00R.

Onozawa, Makoto: *See—*
Kitou, Kouji; and Onozawa, Makoto, 4,956,587, Cl. 315-408.000.

Ooi, Kenta; Miyai, Yoshitaka; and Katoh, Shunsaku, to Japan as represented by Director General of Agency of Industrial Science and Technology. Method for concentration determination of lithium ions. 4,956,062, Cl. 204-153.150.

Ooishi, Hiroshi, to Koyo Seiko Co., Ltd. Hydraulic power steering apparatus. 4,955,446, Cl. 180-143.000.

Ookuma, Kuniaki: *See—*
Honma, Eiichi; Hironaka, Masakazu; Miyanaka, Masaki; Ito, Yutaka; Ookuma, Kuniaki; and Kamiyar a, Yoshiteru, 4,955,463, Cl. 198-346.100.

Ootani, Kouichi: *See—*
Okajima, Taizo; Ootani, Kouichi; and Yamada, Tsutomu, 4,956,015, Cl. 106-3.000.

Ootsuki, Noboru; Tomioka, Katsumi; and Conishi, Toshihiko, to Nippon Air Brake Co., Ltd. Lock unit for a fluid coupling apparatus. 4,955,122, Cl. 29-237.000.

Opitz, Reinhard; and Schellenberg, Lutz, to Gerhard Collardin GmbH. Anticorrosive agents and use thereof. 4,956,016, Cl. 106-14.120.

Optische werke G. Rodenstock: *See—*
Barth, Rudolf; Guilino, Gunther; and Kalder, Dieter, 4,955,712, Cl. 351-169.000.

Optyl Eyewear Fashion International Corporation: *See—*
Schmidthaler, Johann J.; and Zach, Ronald, 4,955,706, Cl. 351-41.000.

Orain, Michel A., to Glaenzer-Spicer. Homokinetic transmission joint having a tripod element connected to a housing element by rolling elements on the tripod element and rolling tracks in the housing element. 4,955,847, Cl. 464-111.000.

Orbisphere Laboratories (Inc.): *See—*
Hale, John M., 4,956,063, Cl. 204-153.170.

Oren, Yoram: *See—*
Giuffrida, Anthony J.; Ganzi, Gary C.; and Oren, Yoram, 4,956,071, Cl. 204-301.000.

Orgill, Dennis P.: *See—*
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.

Oriental Motors Corp., Ltd.: *See—*
Hirofumi, Satomi; and Hideo, Domeki, 4,956,595, Cl. 318-696.000.

Oronzio de Nora Permelec S.p.A.: *See—*
Dempsey, Russell M.; Coker, Thomas G.; LaConti, Anthony B.; and Fragala, Anthony R., 4,956,061, Cl. 204-128.000.

O'Rourke, Michael W.: *See—*
Sunseri, Ronald H.; and O'Rourke, Michael W., 4,956,501, Cl. 525-64.000.

Orth, Peter; and Witt, Ulrich, to Hella KG Hueck & Co. Vehicle pane washing apparatus, particularly for headlight diffusing lenses. 4,955,543, Cl. 239-284.200.

Osaka Bousui Construction Co., Ltd.: *See—*
Miyazaki, Yasuo; Kamide, Akira; and Watari, Shigeki, 4,956,041, Cl. 156-267.000.

Oshidari, Toshikazu, to Nissan Motor Co., Ltd. Hydraulic control system for transmission. 4,955,260, Cl. 74-868.000.

Oshima, Kazuyoshi: *See—*
Kajigaya, Kazuhiko; Kotani, Hiroshi; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.

Oshima, Kunio: *See—*
Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, 4,956,539, Cl. 219-121.800.

Oshima, Masaki: *See—*
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Osteonics Corp.: *See—*
Zarnowski, Alfred J.; and Cohen, Robert C., 4,955,325, Cl. 623-22.000.

Osterhoudt, Hans W.: *See—*
Bayer, Gerald W.; Diamantopoulos, Paul A.; Osterhoudt, Hans W.; and Schmit, Paul F., 4,956,181, Cl. 424-448.000.

Osterloh, Rolf: *See—*
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 4,956,402, Cl. 523-415.000.

Ota, Hideo: *See—*
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.

Ota, Kiyoshi: *See—*
Arai, Kazuo; and Ota, Kiyoshi, 4,956,730, Cl. 360-70.000.

Otsuka Chemical Co., Ltd.: *See—*
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.

Otsuka, Hirohisa, to Ricoh Company, Ltd. Wire cleaning device for a corona discharge type charger. 4,956,671, Cl. 355-215.000.

Otsuka, Nobuaki: *See—*
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.

Ott, Karl-Heinz: *See—*
Leitz, Edgar; Buyach, Hans-Josef; Bottenbruch, Ludwig; and Ott, Karl-Heinz, 4,956,485, Cl. 556-446.000.

Ottieri, Marco T. Ski boot with ankle support. 4,955,149, Cl. 36-119.000.

Otto Bock Orthopaedische Industrie Besitz-und Verwalktungs-Kommanditgesellschaft: *See—*
Wellershaus, Ulf; and Fruzinsky, Otto, 4,955,920, Cl. 623-36.000.

Otto, Friedrich, to A. Stephan u. Soehne GmbH & Co. Food processing machine. 4,955,724, Cl. 366-314.000.

Otto, Manfred R.; Reed, Edwin A.; and Hug, William F. Metal vapor laser having means to extend lifetime of tube. 4,956,845, Cl. 372-56.000.

Outboard Marine Corporation: *See—*
Lam, Edward K.; and Luksch, Heinrich E., 4,955,833, Cl. 440-49.000.
Wenstadt, Thomas D., 4,955,838, Cl. 440-89.000.
Wetor, Clyde R., 4,955,249, Cl. 74-473.00R.

Outokumpu Oy: *See—*
Hindstrom, Rolf, 4,956,088, Cl. 210-327.000.

Ovens, Kevin: *See—*
Hunley, Steven A.; and Ovens, Kevin, 4,956,567, Cl. 307-310.000.

Overton, James R.; Stafford, Steven L.; and Sumner, Charles E., Jr., to Eastman Kodak Company. Polyester from hydroxyethoxyphenoxy acetic acid with improve gas barrier properties. 4,956,443, Cl. 528-206.000.

Owen, Hartley: *See—*
Harandi, Mohsen N.; and Owen, Hartley, 4,956,509, Cl. 585-300.000.

Owens-Corning Fiberglas Corporation: *See—*
Sieloff, Ronald F., 4,956,409, Cl. 524-211.000.
Vermilion, Donn R., 4,956,500, Cl. 525-54.500.

Oxley Developments Company Limited: *See—*
Edwards, Geoffrey S.; and Tebble, Robert S., 4,956,550, Cl. 250-227.150.

Oyagi, Takashi: *See—*
Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.

Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device having an isolation oxide film. 4,956,692, Cl. 357-49.000.

Ozaki, Hiroji: *See—*
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Ozawa, Hiromasa: *See—*
Onishi, Masayoshi; and Ozawa, Hiromasa, 4,955,954, Cl. 192-0.02R.

Ozawa, Kazuhito, to Sharp Kabushiki Kaisha. Method for mounting a semiconductor chip. 4,955,132, Cl. 29-840.000.

Ozawa, Shigeo: *See—*
Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kitsutaka, Eiji, 4,955,257, Cl. 74-866.000.

Ozawa, Susumu: *See—*
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.

P.C.T. Systems, Inc.: *See—*
Miranda, Henry R., 4,955,402, Cl. 134-107.000.

Paarma, Jyrki: *See*—
Rintala, Kari; Paarma, Jyrki; and Sissala, Mikko, 4,955,484, Cl. 209-599.000.
Paco Pharmaceutical Services, Inc.: *See*—
Chang, Yunik, 4,956,171, Cl. 424-449.000.
Padilla, Rigoberto. Foot support assembly. 4,955,148, Cl. 36-44.000.
Paff, Armin J.: *See*—
Edwards, Donald W.; Paff, Armin J.; and Duan, Daniel C., 4,956,230, Cl. 428-341.000.
Pafford, Thomas L. Fiber optic telescope. 4,955,687, Cl. 350-96.250.
Paidosh, Richard L.: *See*—
McQuade, John M.; and Paidosh, Richard L., 4,956,702, Cl. 358-75.000.
Paisley, Gary V.: *See*—
Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., 4,955,507, Cl. 222-65.000.
Palencher, Jacques; and Jaillant, Gabriel, to Radio Controle S.A. Apparatus for measuring an electrical quantity with an adjustable zero position and double pivot arrangement. 4,956,601, Cl. 324-154.0PB.
Palicka, Cathy S.: *See*—
Caniglia, Leslie A.; and Palicka, Cathy S., 4,955,914, Cl. 606-235.000.
Paloma Kogyo Kabushiki Kaisha: *See*—
Ejiri, Susumu, 4,955,324, Cl. 122-510.000.
Ishiguro, Katsusuke; Hayakawa, Tsuneyasu; and Yokoyama, Nobuyoshi, 4,955,805, Cl. 431-1.000.
Panholzer, Heinrich: *See*—
Holuigue, Claude; Panholzer, Heinrich; Maier, Karl-Wilhelm; and Trimmel, Wolfgang, 4,956,849, Cl. 373-120.000.
Panovic, Vlatko. Swivel connector. 4,955,749, Cl. 403-11.000.
Papajesk, James G.: *See*—
Donate, Felipe A.; Hartwell, George E.; DeBolt, Bruce D.; Papajesk, James G.; and Buzzard, Mark V., 4,956,017, Cl. 106-311.000.
Pape, Gunter: *See*—
Harting, Dietmar; Nagel, Hans; and Pape, Gunter, 4,955,819, Cl. 439-79.000.
Pappas, Michael J.; and Buechel, Frederick F. Multi-component joint prosthesis with increased wall flexibility facilitating component assembly. 4,955,919, Cl. 623-22.000.
Papst-Motoren & Co. GmbH: *See*—
Wrobel, Gunter, 4,955,791, Cl. 417-354.000.
PAR Microsystems Corp.: *See*—
Boatwright, Darrell L., 4,956,836, Cl. 370-16.100.
Paramythioti, Michel, to Societe a Responsabilite Limitee dite MENSI. Apparatus for effecting the sweep of a beam of light strictly plane and parallel to a given axis. 4,956,552, Cl. 250-236.000.
Pardo, Beatriz E.: *See*—
Klamer, Reuben B.; Lappen, David I.; Lappen, William A.; and Pardo, Beatriz E., 4,956,775, Cl. 364-411.000.
Parenti, Francesco: *See*—
Riva, Ernesto; Denaro, Maurizio; Selva, Enrico; Cassani, Giovanni; and Parenti, Francesco, 4,956,293, Cl. 435-253.200.
Parker, Robert L.; and Reed, Charles G., to Invenomed, Inc. Fluid monitoring apparatus. 4,955,391, Cl. 128-771.000.
Parker, William P. Interactive luminous panel display device. 4,956,577, Cl. 313-634.000.
Parrish, William J., to Amber Engineering, Inc. Wafer scale testing of redundant integrated circuit dies. 4,956,602, Cl. 324-158.00R.
Parsons, Kevin L.; Grundy, Gary M.; and Dunstand, Jacqueline M. Baton clip for expandable batons. 4,955,518, Cl. 224-247.000.
Parsons, Sandra M. Hair curler. 4,955,401, Cl. 132-262.000.
Pascucci, Luigi: *See*—
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.
Passat-Maschinenbau GmbH: *See*—
Geiger, Friedrich, 4,955,214, Cl. 68-242.000.
Pasternack, Adalbert, to Dragerwerk Aktiengesellschaft. Closed cycle gas mask and breathing equipment for operation under pressure having a severance-operated connection shut-off for the breathing equipment. 4,955,374, Cl. 128-207.120.
Pastrano, Anthony. Disc-shaped throwing toy. 4,955,841, Cl. 446-46.000.
Patel, Bakulesh N.: *See*—
Marinescu, Florin; Patel, Bakulesh N.; and Hammond, William M., 4,955,420, Cl. 160-178.200.
Patel, Mahesh G.; Horan, Ann C.; Marquez, Joseph A.; and Waitz, J. Allan, to Schering Corporation. Antifungal triacetylenic dioxolone from *Microbispora sp.* SCC 1438, ATCC 53620. 4,956,383, Cl. 514-467.000.
PATH: *See*—
Thomas, Ronny D., 4,955,871, Cl. 604-217.000.
Patton, Thomas J.: *See*—
Novinski, Michael V.; and Patton, Thomas J., 4,955,481, Cl. 206-534.000.
Paugger, Anton: *See*—
Ickinger, Georg; Fermuller, Willibald; Paugger, Anton; and Pinter, Reinhard, 4,955,268, Cl. 29-130.000.
Paul, Francois B.: *See*—
Auriol, Daniel H.; Paul, Francois B.; and Monsan, Pierre F., 4,956,489, Cl. 560-40.000.
Paulos, Harry D., to Olympic Machines, Inc. Raised depressible pavement marker. 4,955,982, Cl. 404-11.000.
Paulsen, James K.: *See*—
Cote, William J.; Kaanta, Carter W.; Leach, Michael A.; and Paulsen, James K., 4,956,313, Cl. 437-203.000.
Paulson, Wayne M.: *See*—
Tam, Gordon; Legge, Ronald N.; and Paulson, Wayne M., 4,956,314, Cl. 437-241.000.
Pawlosky, Anthony J. One piece inserted saw tooth. 4,955,273, Cl. 83-845.000.
Pawlowski, Georg; and Lehmann, Peter, to Hoechst Aktiengesellschaft. Photosensitive diazo and photopolymerizable recording material with a photosensitive diazo intermediate layer. 4,956,261, Cl. 430-156.000.
Pawluk, Robert J., to Columbia University in the City of New York, The Trustees of. Dual-taper, asymmetric hole placement in reconstruction and fracture plates. 4,955,886, Cl. 606-69.000.
Pawluk, Robert R., to United Wire & Cable (Canada) Inc.; and UMR-Lukton Inc. Armoured electric cable with integral tensile members. 4,956,523, Cl. 174-107.000.
Payne, Le Roy. Ditch lining apparatus and method and product therefrom. 4,955,759, Cl. 405-270.000.
Payne, Le Roy. Laminate forming and applying apparatus and method and product therefrom. 4,955,760, Cl. 405-270.000.
Payne, Le Roy. Continuous molding apparatus and method. 4,956,133, Cl. 264-39.000.
Payne, Le Roy. Molding apparatus and method. 4,956,135, Cl. 264-40.700.
Pazzaglia, Luigi, to Cefin S.p.A. Device for pre-calibrating hollow cylindrical bodies in seam welding machines. 4,956,536, Cl. 219-64.000.
PBS Enterprises, Inc.: *See*—
Richer, Mark S.; Adeyeye, Aderemi A.; and Helgert, Hermann, 4,956,709, Cl. 358-147.000.
PCC Airfoils, Inc.: *See*—
Blazek, William S., 4,955,423, Cl. 164-35.000.
Pearce, Roger: *See*—
Baker, Geoffrey; Pearce, Roger; and Williamson, Paul L., 4,956,554, Cl. 250-338.300.
Pease, Timothy K.: *See*—
Bricker, Cedric L.; Pease, Timothy K.; and Kammeyer, Donald L., 4,955,130, Cl. 29-734.000.
Pease Windamatic Systems, Inc.: *See*—
Bricker, Cedric L.; Pease, Timothy K.; and Kammeyer, Donald L., 4,955,130, Cl. 29-734.000.
Pehl, Richard H.; Madden, Norman W.; and Malone, Donald F., to University of California, The Regents of the. Cryostat including heater to heat a target. 4,955,204, Cl. 62-51.100.
Pelton, Scott L.: *See*—
Sankrithi, Mithra M. K. V.; and Pelton, Scott L., 4,956,780, Cl. 364-428.000.
Pelzig, Josef. Plastic composition for toys, novelty items and arts and crafts. 4,956,404, Cl. 524-48.000.
Penick Corporation: *See*—
Harmetz, Ronald; Laurenzo, Louis A.; and Petrocine, David V., 4,956,429, Cl. 426-271.000.
Penner, Horst: *See*—
Hagel, Rainer; Redecker, Klaus; and Penner, Horst, 4,956,029, Cl. 149-19.800.
Penn's Woods Products, Inc.: *See*—
Piper, Frank R., 4,955,845, Cl. 446-397.000.
Pennsylvania Research Corporation, The: *See*—
Millner, Patricia M., 4,955,876, Cl. 604-385.200.
Pennwalt Corporation: *See*—
Husain, Altaf; and Wheaton, Gregory A., 4,956,494, Cl. 562-118.000.
Pennzoil Products Company: *See*—
Wilburn, Bruce E.; and Heilman, William J., 4,956,111, Cl. 252-56.00R.
Penven, Paul: *See*—
Michel, Philippe; Moradpour, Alexandre; and Penven, Paul, 4,956,508, Cl. 585-26.000.
Peralto, Linda J.: *See*—
Hamel, Douglas M.; and Peralto, Linda J., 4,955,470, Cl. 206-213.000.
Perez, Richard; and Deida, Jose F. Combined visor and sunglasses assembly. 4,955,087, Cl. 2-12.000.
Perkin Elmer Corporation, The: *See*—
Dean, Robert L.; Young, Lydia J.; and Veneklasen, Lee H., 4,956,024, Cl. 134-37.000.
Perma Power Electronics, Inc.: *See*—
Schornack, Louis W., 4,956,563, Cl. 307-66.000.
Perner, Johannes: *See*—
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, to BASF Lacke & Farben Aktiengesellschaft. Synthetic resin with basic nitrogen groups from resins reacted with the ketimine-urethane product of an alkanolamine, a ketone and anisocyanate. 4,956,402, Cl. 523-415.000.
Perret, Joel: *See*—
Pribat, Didier; Perret, Joel; Rouffy, Jean-Claude; and Velasco, Gonzalo, 4,956,073, Cl. 204-426.000.
Perrigo, John M. Multiple purpose electromechanical vehicle signal device. 4,956,632, Cl. 340-463.000.
Peschke, John R.: *See*—
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., 4,955,689, Cl. 350-96.340.

Pessi, Antonello: *See—*
Verdini, Antonio S.; Bonelli, Fabio; and Pessi, Antonello, 4,956,449, Cl. 530-324.000.
Pessina, Gianluigi: *See—*
Gola, Alberto; and Pessina, Gianluigi, 4,956,570, Cl. 307-570.000.
Peters, James W.: *See—*
Barker, George W.; Crumpler, Michael G.; Peters, James W.; and Hughey, Delmar R., 4,955,216, Cl. 72-10.000.
Peters, Thomas E.: *See—*
Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., 4,956,202, Cl. 427-215.000.
Peters, Timothy J.: *See—*
Batishko, Charles R.; Kirihara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., 4,956,558, Cl. 250-461.100.
Petersen, Jens K.; and Sorensend, Ole V., to Danfoss A/S. Hydrostatic steering device. 4,955,444, Cl. 180-132.000.
Petersen, Uwe: *See—*
Schriewer, Michael; Grohe, Klaus; and Petersen, Uwe, 4,956,465, Cl. 546-156.000.
Peterson, Donald M., to Haggerty, James A.; and Hawkes, Thomas E. Stop apparatus for use in collets. 4,955,622, Cl. 279-15.000.
Peterson, Patrick M.: *See—*
Zurek, Patrick M.; Greenberg, Julie E.; and Peterson, Patrick M., 4,956,867, Cl. 381-94.100.
Petrocine, David V.: *See—*
Harmetz, Ronald; Laurenzo, Louis A.; and Petrocine, David V., 4,956,429, Cl. 426-271.000.
Petrolite Corporation: *See—*
Thompson, Neil E. S.; and Asperger, Robert G., 4,956,099, Cl. 210-764.000.
Petrousky, James A.; Backofen, Joseph E.; and Butz, Donald J., to United States of America, Navy. Shaped charge with explosively driven liquid follow through. 4,955,939, Cl. 102-476.000.
Pettine, Kenneth A. Achilles tendon rehabilitation brace and method for its manufacture. 4,955,370, Cl. 128-80.00E.
Petty, Byron, to Fiberlite. Receptacle update device. 4,955,499, Cl. 220-4.00E.
Pfaff Industriemaschinen GmbH: *See—*
Kolb, Wolfgang; and Albrecht, Ernst, 4,955,307, Cl. 112-304.000.
Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, to Mannesmann Aktiengellschaft. Drill pipe coupling. 4,955,644, Cl. 285-333.000.
Pfirenmaier, Heinz; and Schmidt, Ewald, to Robert Bosch GmbH. High-frequency component. 4,956,627, Cl. 336-65.000.
Pfizer Hospital Products Group, Inc.: *See—*
Farrar, Quinton J.; Everett, Frederick A., Jr.; and Heimann, Richard H., 4,955,874, Cl. 604-319.000.
Rajlevsky, Jack, 4,955,873, Cl. 604-322.000.
Pfizer Inc.: *See—*
Arrowsmith, John E.; Cross, Peter E.; Dickinson, Roger P.; and Thomas, Geoffrey N., 4,956,382, Cl. 514-443.000.
Cullen, Walter P.; Hauske, James R.; Maeda, Hiroshi; and Tone, Junsuke, 4,956,283, Cl. 435-76.000.
Pfleiderer, Hans-Joerg: *See—*
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, 4,956,613, Cl. 330-253.000.
Pflueger, Werner: *See—*
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PGM Diversified Industries, Inc.: *See—*
Galm, James M.; and Podany, Mark E., 4,956,610, Cl. 324-425.000.
Pham, Dinh-Tuong, to Herman Miller, Inc. Drawer interlock. 4,955,672, Cl. 312-107.500.
Phelps, Richard A.: *See—*
Lorence, Brian S.; and Phelps, Richard A., 4,955,571, Cl. 248-311.200.
Phillips, Edward H., to Techco Corporation. Vehicular power steering system. 4,956,590, Cl. 318-432.000.
Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., to Gist-Brocades N.V. Process for producing 4-(2-methoxyethyl)-phenyl-glycidyl ether and/or metoprolol. 4,956,284, Cl. 435-123.000.
Phillips, James D.: *See—*
de Bruin, Johannes B.; Hewitt, Mary J.; and Phillips, James D., 4,956,687, Cl. 357-30.000.
Phillips Petroleum Company: *See—*
Eastman, Alan D.; Johnson, Marvin M.; and Skinner, Richard D., 4,956,476, Cl. 548-552.000.
Elliott, David J.; and Kolts, John H., 4,956,330, Cl. 502-326.000.
Harrison, Roger G., Jr.; and Nelles, Lynn P., 4,956,290, Cl. 435-189.000.
Kolts, John H.; and Delzer, Gary A., 4,956,515, Cl. 585-651.000.
Lee, Fu M., 4,955,468, Cl. 203-53.000.
Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.
Matson, Michael S.; and Cobb, Raymond L., 4,956,507, Cl. 570-140.000.
Phillips, Steven J. Method and apparatus for installing a ventricular assist device cannulae. 4,955,856, Cl. 600-16.000.
Picker, Donald H.: *See—*
Hefferman, James G.; Hydes, Paul C.; and Picker, Donald H., 4,956,454, Cl. 530-389.000.
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Ickinger, Georg; Fermuller, Willibald; Paugger, Anton; and Pinter, Reinhard, 4,955,268, Cl. 29-130.000.
Pioneer Aerospace Corporation: *See—*
Reuter, James D., 4,955,564, Cl. 244-149.000.
Pioneer Electronic Corporation: *See—*
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Pirttiaho, Aimo: *See—*
Jansson, Rainer; and Pirttiaho, Aimo, 4,955,969, Cl. 280-824.000.
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Freeman, Gerald C.; and Feinland, Seymour, 4,956,782, Cl. 364-464.030.
Gough, Rex M. K., 4,955,186, Cl. 53-569.000.
O'Dea, Kevin J.; and McDermott, Francis E., 4,955,483, Cl. 209-548.000.
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Look, Robert O.; and Pittman, Deborah M., 4,955,822, Cl. 439-505.000.
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Lyon, William E., 4,955,158, Cl. 47-81.000.
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Platti, Rita J. Raker taker I. 4,955,925, Cl. 15-257.600.
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Henning, Michael L.; and Lamb, Christopher, 4,956,549, Cl. 250-227.140.
Podany, Mark E.: *See—*
Galm, James M.; and Podany, Mark E., 4,956,610, Cl. 324-425.000.
Pogue, David C. Weight lifting rack. 4,955,604, Cl. 272-123.000.
Pohl, Reinhold; Dresselmann, Manfred; and Hessmann, Hans-Wilhelm, to Robota GmbH Feuerungs- und Schornsteinbau. Arrangement for the demolition of smokestacks. 4,955,457, Cl. 182-128.000.
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Polan, Ned W.; Smialek, Raymond J.; and Menkin, Paul, to Olin Corporation. Apparatus and process for the production of micro-pore free high ductility metal foil. 4,956,053, Cl. 204-13.000.
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Gazeley, Albert E., 4,955,707, Cl. 351-47.000.
Niles, Thomas J., 4,956,665, Cl. 355-50.000.
Quintana, Victor E., 4,956,683, Cl. 357-17.000.

Poleschinski, Richard: *See*—
Froese-Peeck, Ruediger; and Poleschinski, Richard, 4,955,680, Cl. 315-382.000.
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Pollack, Gordon P.; Matloubian, Mishel; and Sundaresan, Ravishankar, to Texas Instruments, Incorporated. Thin oxide sidewall insulators for silicon-over-insulator transistors. 4,956,307, Cl. 437-40.000.
Pollack, Jack. Bearing arrangement for single point terminal. 4,955,310, Cl. 114-230.000.
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Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, 4,956,445, Cl. 528-230.000.
Polysar Limited: *See*—
Ayub, Abdul L.; and Schwarz, Herbert F., 4,956,398, Cl. 523-209.000.
Pommrehn, Mark R.: *See*—
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Pomrehn, Leonard P.: *See*—
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Pontius, Jeffrey S., to Columbus Industries, Inc. Range hood filter pad. 4,955,995, Cl. 55-274.000.
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Moskowitz, David; and Porat, Reuven, 4,956,318, Cl. 501-96.000.
Porter, Joseph B. Tie clip. 4,955,112, Cl. 24-49.00C.
Porter, Ronald D.: *See*—
Buzby, Jeffrey S.; Porter, Ronald D.; and Stevens, S. Edward, Jr., 4,956,280, Cl. 435-69.100.
Potter, Christopher M.; Hjipieris, George; and Bunyan, Paul, to Marconi Instruments Limited. Connector. 4,955,826, Cl. 439-578.000.
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., to R. J. Reynolds Tobacco Company. Smoking article. 4,955,399, Cl. 131-359.000.
Powers, Thomas F.: *See*—
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Marshall, Dennis L.; Behm, Dale H.; Eberle, Theodore F.; and Powers, Thomas F., 4,955,491, Cl. 215-12.100.
PPG Industries, Inc.: *See*—
Schaefer, William L.; and Reese, Walter J., 4,955,999, Cl. 65-4.400.
Pratt, Clyde R.: *See*—
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Ferguson, Gregory A., 4,955,520, Cl. 226-74.000.
Prendergast, Patrick T., to Colthurst Limited. Agents for the arrest and therapy of retroviral infections. 4,956,355, Cl. 514-178.000.
President and Fellows of Harvard College: *See*—
Kennedy, Ronald C.; Dreesman, Gordon R.; and Essex, Myron, 4,956,273, Cl. 435-5.000.
Presidenza Del Consiglio Dei Ministri: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.
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Tompkins, Thomas M.; and Presty, Dominic F., 4,955,959, Cl. 227-178.000.
Pretchel, David A.; Venaleck, Howard J.; and Venaleck, John T. Two pin shunt. 4,955,824, Cl. 439-510.000.
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Hohr, Dieter; Preuss, August-Wilhelm; Schug, Kurt-Peter; and Riegel, Helmut, 4,955,331, Cl. 123-1.00A.
Previdoli, Felix: *See*—
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,956,473, Cl. 548-408.000.
Pribat, Didier; Perret, Joel; Rouffy, Jean-Claude; and Velasco, Gonzalo, to Thomson-CSF. Method to make microcavities and its application to an electrochemical sensor. 4,956,073, Cl. 204-426.000.
Price, Henry C., to Llanelli Radiators Limited. Radiator assembly and a cowl assembly therefor. 4,955,434, Cl. 165-122.000.
Priem, Curtis; and Malachowsky, Chris, to Sun Microsystems, Inc. Matrix arithmetic circuit for processing matrix transformation operations. 4,956,801, Cl. 364-748.000.
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Prime Computer, Inc.: *See*—
Neustaedter, Tarl, 4,956,771, Cl. 364-200.000.
Procter & Gamble Company, The: *See*—
Fakoukakis, Emanuel P.; Mustatea, Sorin V.; and Bellmann, Gunter, 4,956,478, Cl. 549-255.000.
Gosselink, Eugene P.; Hardy, Frederick E.; and Trinh, Toan, 4,956,447, Cl. 528-272.000.
Produits Carmine Inc.: *See*—
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Proform Fitness Products, Inc.: *See*—
Bersonnet, George; and Dalebout, William T., 4,955,599, Cl. 272-73.000.
Propes, Michael L. Partitioned drinking cup. 4,955,503, Cl. 220-526.000.
Prosl, Frank R.: *See*—
Enegren, Bradley J.; Melsky, Gerald S.; and Prosl, Frank R., 4,955,861, Cl. 604-141.000.
Prosser, Robert. Mirror defogger. 4,956,542, Cl. 219-219.000.
Protectaire Systems Co.: *See*—
Napadow, Stanley C., 4,955,990, Cl. 55-90.000.
Provencher, Roland L. Convertible bench seat for vans. 4,955,973, Cl. 296-65.100.
Provost, George A., to Velcro Industries B.V. Reclosable bag having hook and loop sealing strips. 4,955,981, Cl. 383-86.000.
Puckette, Thomas A., to Eastman Kodak Company. Preparation of bidentate ligands. 4,956,055, Cl. 204-72.000.
Pugel, Michael A., to RCA Licensing Corporation. Television receiver tuner high pass input filter with CB trap. 4,956,710, Cl. 358-188.000.
Pugh, Charles S. G.: *See*—
Gordon, Julian; and Pugh, Charles S. G., 4,956,302, Cl. 436-161.000.
Pugh, Gregory E. Arrow holding and loading device for archery bows. 4,955,355, Cl. 124-52.000.
Puletti, Paul P.: *See*—
Kauffman, Thomas F.; and Puletti, Paul P., 4,956,207, Cl. 428-34.200.
Purdue Research Foundation: *See*—
Badylak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., 4,956,178, Cl. 424-551.000.
PZF, Inc.: *See*—
Frisk, Don L., 4,955,556, Cl. 242-107.40B.
Q-CO Industries, Inc.: *See*—
O'Connor, Chadwell; and Johnson, Joel W., 4,955,568, Cl. 248-183.000.
Quadflieg, Erich: *See*—
Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, 4,955,644, Cl. 285-333.000.
Quadro, Giuseppe; and Cahn, Jean, to Yason S.R.L.; and SIR International S.A. Compounds having calcium blocking activity. 4,956,389, Cl. 514-654.000.
Quaker Oats Company, The: *See*—
Moomaw, David E., 4,955,840, Cl. 446-17.000.
Quallich, Robert J. Rafter gun rack. 4,955,487, Cl. 211-64.000.
Qualline, Steve M.; and Dunnam, Louis R. Tornado underground shelter. 4,955,166, Cl. 52-169.600.
QuanScan, Inc.: *See*—
West, Paul E.; and Jahanmir, Jamshid, 4,956,817, Cl. 365-189.010.
Quantum Chemical Corporation: *See*—
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Quartz et Silice: *See*—
Luc, Jean-Claude, 4,956,134, Cl. 264-40.200.
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Quesnel, Andre-Paul: *See*—
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Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., 4,956,441, Cl. 528-171.000.
Quinn, James P.: *See*—
Aldcroft, Derek; Newton, John; Quinn, James P.; and Stanier, Peter W., 4,956,167, Cl. 423-339.000.
Quintana, Victor E., to Polaroid Corporation. Isolation of p-n junctions. 4,956,683, Cl. 357-17.000.
R. G. Barry Corporation: *See*—
Hudspith, Derick, 4,955,469, Cl. 206-45.230.
R. J. Reynolds Tobacco Company: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.
Radio Controle S.A.: *See*—
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Radtke, Jeffrey L., to Siemens Analytical X-Ray Instruments, Inc. Radiation scintillation detector. 4,956,556, Cl. 250-368.000.
Ragonese, Francis P.: *See*—
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
Rahill, Paul F., to Industrial Equipment & Engineering Company. Method and apparatus for comminuting cremation remains. 4,955,548, Cl. 241-30.000.
Raible, Fred A. Swivel mail box. 4,955,534, Cl. 232-39.000.
Railway Technical Research Institute: *See*—
Ikeda, Haruo, 4,955,303, Cl. 104-292.000.
Rajala, Gregory J.; and King, Lon M., to Kimberly-Clark Corporation. Fastening means, apparatus, and methods. 4,955,113, Cl. 24-448.000.

Rajlevsky, Jack, to Pfizer Hospital Products Group, Inc. Stabilizing support stand. 4,955,873, Cl. 604-322.000.

Raker, Mark L.: *See*—
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.

Ramni, Karthik: *See*—
Miller, Alan K.; Ramni, Karthik; and Gur, Micha M., 4,955,803, Cl. 425-145.000.

Ranson, Ronald W. Uniform flow hydraulic system. 4,955,282, Cl. 91-436.000.

Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., to Lanxide Technology Company, LP. Methods for forming complex oxidation reaction products including superconducting articles. 4,956,338, Cl. 505-1.000.

Rasmussen, Donald E.: *See*—
Batishko, Charles R.; Kirihara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., 4,956,558, Cl. 250-461.100.

Rastelli, Gerard. Method and apparatus for training in the martial arts. 4,955,602, Cl. 272-76.000.

Rau, Georg; Hitzler, Werner; and Riess, Gerhard, to Georg Knoblauch Firma. Flip-top drill-bit storage and display box. 4,955,478, Cl. 206-379.000.

Rau, Wolfgang: *See*—
Benz, Erwin; Rau, Wolfgang; Bauer, Rainer; and Willy, Gerd, 4,955,570, Cl. 248-300.000.

Raubenheimer, Hans-Juergen: *See*—
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.

Raum, Jack R.: *See*—
Straight, Michael R.; and Raum, Jack R., 4,955,465, Cl. 198-778.000.

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Kivi, Ilkka; Manner, Tapio; Kuvaja, Kari; and Terava, Jorma, 4,955,970, Cl. 285-149.000.

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Hayn, Holger V.; and Rausch, Juergen, 4,955,674, Cl. 303-114.000.

Rauschenbach, Kurt: *See*—
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Carlommagno, William D.; Cummings, Dennis E.; and Gliga, Alexandru S., 4,955,523, Cl. 228-179.000.
Jacobs, Stephen M.; McTavish, Mary S.; and Doljack, Frank A., 4,955,267, Cl. 29-611.000.

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Pugel, Michael A., 4,956,710, Cl. 358-188.000.

RD Chemical Company: *See*—
Sedlak, Rudolf P., 4,956,035, Cl. 156-664.000.

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Robison, James W., Jr., 4,956,009, Cl. 75-307.000.

Reccius, Helmut, to Dornier Luftfahrt GmbH. Deforming panels having ribs. 4,955,222, Cl. 72-295.000.

Reck, Bernhard, to EJOT Eberhard Jaeger GmbH & Co. KG. Connecting element. 4,955,772, Cl. 411-175.000.

Reckelhoff, John R.: *See*—
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., 4,956,182, Cl. 424-476.000.

Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., to Sundstrand Corporation. Low distortion control for a VSCF generating system. 4,956,598, Cl. 322-28.000.

Reddehase, Horst: *See*—
Beer, Dieter; Reddehase, Horst; Kerbstat, Siegfried; Hanning, Detlef; Plass, Ulrich; and Krause, Hermann, 4,956,747, Cl. 361-392.000.

Redecker, Klaus: *See*—
Hagel, Rainer; Redecker, Klaus; and Penner, Horst, 4,956,029, Cl. 149-19.800.

Reeber, Robert R.; Chu, Wei-Kan; and Bedair, Salah M. Gradient lens fabrication. 4,956,000, Cl. 65-18.100.

Reed, Andrew M. Method and apparatus for monitoring pressure of human tissue expansion devices. 4,955,905, Cl. 623-8.000.

Reed, Charles G.: *See*—
Parker, Robert L.; and Reed, Charles G., 4,955,391, Cl. 128-771.000.

Reed, Edwin A.: *See*—
Otto, Manfred R.; Reed, Edwin A.; and Hug, William F., 4,956,845, Cl. 372-56.000.

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Griffin, Nigel D., 4,956,238, Cl. 428-408.000.

Reese, Walter J.: *See*—
Schaefer, William L.; and Reese, Walter J., 4,955,999, Cl. 65-4.400.

Regel, Karl H.: *See*—
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Regie Nationale des Usines Renault: *See*—
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Regunathan, Perialwar: *See*—
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Rehabilitation Institute of Chicago: *See*—
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Fosali, Tellef;; Reichelt, Karl L.; Skraastad, Oyvind; and Edminson, Paul D., 4,956,344, Cl. 514-18.000.

Reichert, Gunther, to Bayer Aktiengesellschaft. Process for removal of hydrogen sulphide using specific iron oxides. 4,956,160, Cl. 423-231.000.

Reifenhauser GmbH & Co. Maschinenfabrik: *See*—
Halter, Hartmut; and Schnell, Willi, 4,955,802, Cl. 425-72.100.

Reiley, Timothy C.: *See*—
Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.00F.

Reimann, Klaus: *See*—
Englisch, Wolfgang; Leber, Helmut; Reimann, Klaus; and Simmat, Fritz, 4,956,059, Cl. 204-130.000.

Reinauer, Josef, to Gottlieb Guhring KG. Boring tool cooled from within made of a tool spiral and a clamping cylinder. 4,955,764, Cl. 408-59.000.

Reinert, Karl A.; and Alcorn, Gary W., to General Motors Corporation. Adjusting device for the pointer element of a drive range indicating display. 4,955,251, Cl. 74-501.50R.

Reinert, Karl A.; and Rendon, Edmund L., Jr., to General Motors Corporation. Modular bolt assembly for steering shaft lock. 4,955,454, Cl. 180-287.000.

Reinhall, Rolf B., to Sunds Defibrator Aktiebolag. Apparatus for treatment of fibre suspensions. 4,955,549, Cl. 241-80.000.

Reinke, Thomas E. Aerial game projectile. 4,955,620, Cl. 273-428.000.

Rendon, Edmund L., Jr.: *See*—
Reinert, Karl A.; and Rendon, Edmund L., Jr., 4,955,454, Cl. 180-287.000.

Renfer, Dale S.: *See*—
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.

Renfrew, Andrew B., to Lucas Industries, plc. Lamp assembly. 4,956,753, Cl. 362-74.000.

Renz, Klaus: *See*—
Becker, Michael; and Renz, Klaus, 4,956,739, Cl. 361-16.000.

Renz, Rainer; and Ilzhoefer, Karl-Heinz, to Daimler Benz Aktiengesellschaft. Welded joint between plastic parts. 4,955,740, Cl. 403-27.000.

Repschlager, Horst; and Riemer, Heinz, to Infas Institut Fur Angewandte Sozialwissenscheft GmbH. Sensor for consumption measurements in a household measuring system. 4,956,551, Cl. 250-231.140.

Research Corporation: *See*—
Buzby, Jeffrey S.; Porter, Ronald D.; and Stevens, S. Edward, Jr., 4,956,280, Cl. 435-69.100.

Research Development Corporation of Japan: *See*—
Harada, Yutaka, 4,956,642, Cl. 341-133.000.

Resnick, Michael: *See*—
Saebeler, Walter; and Resnick, Michael, 4,955,855, Cl. 493-404.000.

Reuter, Horst; Quast, Jorn-Rainer; and Schall, Roland, to Boge AG. Bearing for the elastic mounting of machines, machine parts and/or vehicle parts. 4,955,588, Cl. 267-140.100.

Reuter, James D., to Pioneer Aerospace Corporation. Main parachute apparatus with secondary parachute for aiding initial inflation thereof. 4,955,564, Cl. 244-149.000.

Rey, Francoise: *See*—
Chermann, Jean-Claude; Rouquette, Blandine; Rey, Francoise; and Barre-Sinoussi, Francoise, 4,956,292, Cl. 435-235.000.

Reynolds Metal Company: *See*—
Honeycutt, LeRoy, III; Key, James C.; and Moody, Herbert, III, 4,955,429, Cl. 164-479.000.

Reynolds, Mickey R.: *See*—
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 4,955,688, Cl. 350-96.290.

Reynolds, Steve J.: *See*—
Staszewski, Edward T.; Reynolds, Steve J.; Vinyard, Richard C.; and Galloway, Bennie E., 4,955,784, Cl. 414-796.400.

Rheinmetall GmbH: *See*—
Metz, Josef; and Hulsewis, Hans, 4,955,281, Cl. 89-43.010.
Nahrwold, Klaus H., 4,955,279, Cl. 89-6.500.
Romer, Rudolf; Becker, Wilfried; and Bisping, Bernhard, 4,955,938, Cl. 102-430.000.

Rhoads, John R. Sealing groove cover. 4,955,500, Cl. 220-212.000.

Rhodes, Charles K.; Boyer, Keith; Solem, Johndale C.; and Haddad, Waleed S., to MCR Technology Corporation. Apparatus for generating x-ray holograms and method for object reconstruction. 4,955,974, Cl. 350-3.670.

Rhone-Poulenc Chimie: *See*—
Cavezzan, Jacques; and Di Martino, Jean-Louis, 4,956,231, Cl. 428-343.000.
Denis, Jean-Pierre; Desmurs, Jean-Roger; and LeCouve, Jean-Pierre, 4,956,496, Cl. 564-404.000.
Letoffe, Michel; Millet, Claude; and Serafini, Serge, 4,956,436, Cl. 528-18.000.

Rhone-Poulenc Sante, a French Body Corporate: *See*—
Goni, Sylvie; Piot, Odile; and Zundel, Jean-Luc, 4,956,362, Cl. 514-217.000.

Ricciardi, Mario, to Bell & Howell Phillipsburg Company. Method and apparatus for feeding and stacking articles. 4,955,596, Cl. 271-110.000.

Richard Berg Aktiebolag: *See*—
Robinson, William, 4,956,090, Cl. 210-512.100.

Richard, Herve: *See*—
Lang, Gerard; Richard, Herve; Leduc, Madeleine; and Junino, Alex, 4,956,174, Cl. 424-63.000.

Richards, William R., Jr.: *See*—
Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., 4,956,306, Cl. 437-34.000.
Richer, Mark S.; Adeyeye, Aderemi A.; and Helgert, Hermann, to PBS Enterprises, Inc.; and EEG Enterprises, Inc. Forward error correction of data transmitted via television signals. 4,956,709, Cl. 358-147.000.
Richer, Steven P. Retractable seat cover. 4,955,665, Cl. 297-4.000.
Richter Gedeon Vegyeszeti Gyor Rt.: *See*—
Kreidl, Janos; Turcsanyi, Peter; Stefko, Bela; Meszaros nee Brill, Judit; and Bogsch, Erika, 4,956,007, Cl. 71-103.000.
Ricoh Company, Ltd.: *See*—
Kiya, Yukitoshi; and Nakazato, Yasushi, 4,956,678, Cl. 355-318.000.
Koshiishi, Takaho, 4,956,876, Cl. 455-78.000.
Mifune, Hironobu; Inada, Toshio; Ueda, Aki; and Ogura, Yukio, 4,955,691, Cl. 350-162.130.
Otsuka, Hirohisa, 4,956,671, Cl. 355-215.000.
Watanabe, Yoichiro; Isoda, Tetsuo; and Aoki, Mitsuo, 4,956,258, Cl. 430-109.000.
Yamaguchi, Katsumi; and Sakuma, Nobuo, 4,955,682, Cl. 350-6.800.
Yamaguchi, Takao, 4,955,700, Cl. 350-423.000.
Ridderheim, Alice F.: *See*—
Ridderheim, Kristen A.; Sudharto, V. Widadi; and Ridderheim, Alice F., 4,955,870, Cl. 604-195.000.
Ridderheim, Kristen A.; Sudharto, V. Widadi; and Ridderheim, Alice F. Hypodermic syringe with retractable needle. 4,955,870, Cl. 604-195.000.
Rider, Christopher B.: *See*—
Dao, Phat T.; Scozzafava, Michael; Schildkraut, Jay S.; and Rider, Christopher B., 4,955,977, Cl. 350-96.340.
Ridings, Henry T.: *See*—
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.
Rieck, Kenneth J. Deck spacing tool. 4,955,142, Cl. 33-526.000.
Riegel, Helmut: *See*—
Hohr, Dieter; Preuss, August-Wilhelm; Schug, Kurt-Peter; and Riegel, Helmut, 4,955,331, Cl. 123-1.00A.
Riegler, Andreas: *See*—
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.
Riemer, Heinz: *See*—
Repschlager, Horst; and Riemer, Heinz, 4,956,551, Cl. 250-231.140.
Riess, Gerhard: *See*—
Rau, Georg; Hitzler, Werner; and Riess, Gerhard, 4,955,478, Cl. 206-379.000.
Rieter Machine Works Ltd.: *See*—
Staheli, Paul; Demuth, Robert; and Fritzsche, Peter, 4,955,266, Cl. 19-105.000.
Rigby, William R.; and Woyce, Louis C., Jr., to Westvaco Corporation. Easy opening lid for ovenable carton. 4,955,530, Cl. 229-123.200.
Right, Robert W., to General Signal Corporation. City tie line connection for fire alarm system. 4,956,634, Cl. 340-521.000.
Rilly, Gerard, to Deutsche Thomson-Brandt GmbH. Line deflection circuit for a picture tube. 4,956,585, Cl. 315-371.000.
Ring, David B.: *See*—
Bjorn, Michael J.; Frankel, Arthur E.; Laird, Walter J.; Ring, David B.; and Winkelhake, Jeffrey L., 4,956,453, Cl. 530-389.000.
Rintala, Kari; Paarma, Jyrki; and Sissala, Mikko, to Kone Oy. Device for separating hard objects, such as stones, from a stream of wood. 4,955,484, Cl. 209-599.000.
Ripley Company, Inc.: *See*—
Matthews, James J., 4,955,137, Cl. 30-90.100.
Rippel, Robert: *See*—
Nimmesgern, Hildegard; Weidmann, Klaus; Lang, Hans-Jochen; Rippel, Robert; and Herling, Andreas W., 4,956,366, Cl. 514-235.800.
Riso Kagaku Corporation: *See*—
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.
Riva, Carlo: *See*—
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.
Riva, Ernesto; Denaro, Maurizio; Selva, Enrico; Cassani, Giovanni; and Parenti, Francesco, to Gruppo Lepetit S.p.A. Nocardia sp. ATCC 53492, or an antibiotic A 42867 producing mutant or variant thereof. 4,956,293, Cl. 435-253.200.
Robba, Fabrizio: *See*—
Prestipino Giarritta, Adriano; and Robba, Fabrizio, 4,955,632, Cl. 280-607.000.
Robbins, Aida F.: *See*—
Klun, Thomas P.; Robbins, Aida F.; and Ali, M. Zaki, 4,956,265, Cl. 430-283.000.
Robbins, Clyde; and Schilling, John, to General Instrument Corporation. Method of providing sound privacy system compatible with mono and btsc stereo audio. 4,956,862, Cl. 380-19.000.
Robbins, Jeffrey D.; and Gless, Richard D., Jr., to ICI Americas Inc. Process for production of thiophosphonates. 4,956,487, Cl. 558-98.000.
Robert Bosch GmbH: *See*—
Barth, Walter; Hausslein, Friedrich; Helm, Winfried; and Stabler, Manfred, 4,955,744, Cl. 403-259.000.
Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Steegmuller, Helmut, 4,955,464, Cl. 198-463.300.
Knoll, Peter; Konig, Winfried; Mock-Hecker, Radiger; and Gunther, Clemens, 4,955,698, Cl. 350-336.000.
Marek, Jiri, 4,955,234, Cl. 73-517.00R.
Pfitzenmaier, Heinz; and Schmidt, Ewald, 4,956,627, Cl. 336-65.000.
Robert Sun Company: *See*—
Briggs, Eugene C.; and Cooperrider, Myron T., 4,955,359, Cl. 126-110.00R.
Roberts, Charles G.: *See*—
Borrello, Sebastian R.; and Roberts, Charles G., 4,956,686, Cl. 357-30.000.
Roberts, James T.; and Silbernagel, Raymond A., to Molex Incorporated. Electrical connector system and insulation displacement terminals therefor. 4,955,816, Cl. 439-421.000.
Robertshaw Controls Company: *See*—
Shopsky, Harvey J., 4,955,583, Cl. 251-11.000.
Robertson, Archibald S., Jr., to Foster Wheeler Development Corporation. Method for driving a gas turbine utilizing a hexagonal pressurized fluidized bed reactor. 4,955,190, Cl. 60-39.020.
Robertson, Brian W.: *See*—
Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., 4,956,284, Cl. 435-123.000.
Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., to Eli Lilly and Company. 3-aryloxy-3-substituted propanamines. 4,956,388, Cl. 514-651.000.
Robertson, Elmer W., III. Flush mounted ceiling air cleaner. 4,955,997, Cl. 55-316.000.
Robeson, Lloyd M.; and Langsam, Michael, to Air Products and Chemicals, Inc. Water or gas purification by bulk absorption. 4,956,095, Cl. 210-670.000.
Robinson, Alan S.: *See*—
Fuller, Mark W.; and Robinson, Alan S., 4,955,540, Cl. 239-20.000.
Robinson, Don, to BioCarb AB. 7-amino-4-methyl-coumarin-3-carboxyalkyl derivates and fluorescent conjugates thereof. 4,956,480, Cl. 549-288.000.
Robinson, Glen P., Jr. Variable water flow control for heat pump water heaters. 4,955,930, Cl. 62-79.000.
Robinson, Kelly S.: *See*—
Arnold, Kenneth A.; Chang, Wunan; and Robinson, Kelly S., 4,956,668, Cl. 355-208.000.
Robinson, Walter C. Surgical tie. 4,955,913, Cl. 606-228.000.
Robinson, William, to Richard Berg Aktiebolag. Hydrocyclone divided into sections. 4,956,090, Cl. 210-512.100.
Robinson, William L.; and Roth, John C., Jr., to Rockwell International Corporation. Three-dimensional packaging of focal plane assemblies using ceramic spacers. 4,956,695, Cl. 357-74.000.
Robison, James W., Jr., to Reactive Metals and Alloys Corporation. Calcium alloy steel additive and method thereof. 4,956,009, Cl. 75-307.000.
Roblon A/S: *See*—
Olesen, John; and Jorgensen, Jorgen, 4,956,039, Cl. 156-180.000.
Robota GmbH Feuerungs- und Schornsteinbau: *See*—
Pohl, Reinhold; Dresselmann, Manfred; and Hessmann, Hans-Wilhelm, 4,955,457, Cl. 182-128.000.
Rock, Erich, to Julius Blum Gesellschaft m.b.H. Guide wall assembly for drawers. 4,955,160, Cl. 312-340.000.
Rockwell-CIM: *See*—
Bertolini, Carlo, 4,955,161, Cl. 49-351.000.
Rockwell International Corporation: *See*—
Arzoian, John; Shih, Shan; and Trachman, Edward G., 4,955,851, Cl. 475-59.000.
McQuilkin, Frederick T., 4,956,008, Cl. 72-427.000.
Robinson, William L.; and Roth, John C., Jr., 4,956,695, Cl. 357-74.000.
Woodberry, Frank J., 4,956,555, Cl. 250-339.000.
Roderer, Thomas C. Belt buckle wrench. 4,955,097, Cl. 7-138.000.
Rodgers, Todd K.: *See*—
Larky, Steven P.; Lucas, Bruce D.; McCabe, Daniel H.; and Rodgers, Todd K., 4,956,638, Cl. 340-701.000.
Rodriguez, Frank N. Float guard for a livestock watering trough. 4,955,322, Cl. 119-78.000.
Rodriquez, Renee L. Reusable diaper pant with disposable liner. 4,955,880, Cl. 604-393.000.
Rodriquez S.p.A.: *See*—
Magazzu', Alfredo, 4,955,312, Cl. 114-280.000.
Rodson, Marius: *See*—
Scher, Herbert B.; and Rodson, Marius, 4,956,129, Cl. 264-4.700.
Roe, Derrick I.: *See*—
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.
Rogers, H. David: *See*—
Davidson, Donald R.; Huang, Pao-Ter; and Rogers, H. David, 4,955,152, Cl. 38-36.000.
Rogers, Tracy G., to Schlegel Corporation. Retaining catch for tip-out sash. 4,955,159, Cl. 49-161.000.
Rogers, W. Leslie; and Clinthorne, Neal H., to University of Michigan, The. Multiple sensor position locating system. 4,956,796, Cl. 364-581.000.
Rogowski, Gregory S.; Davidson, Thomas F.; and Ludlow, Timothy, to United States of America, Air Force. Insulating liner for solid rocket motor containing vulcanizable elastomer and a bond promoter which is a novolac epoxy or a resole treated cellulose. 4,956,397, Cl. 523-138.000.

Rohm, Gunter H. Self-tightening and lockable hammer-drill chuck. 4,955,623, Cl. 279-60.000.

Rohrer, Michael D.; and Bulard, Ronald A., to University of OK, The Board of Regents of the. Method and apparatus for sterilizing contact lenses. 4,956,155, Cl. 422-297.000.

Rohringer, Peter: *See*—
Bernheim, Michael; Strasilla, Dieter; De Sousa, Bernardo; and Rohringer, Peter, 4,956,049, Cl. 162-158.000.

Rolles, Rolf; and Humphries, Darral V., to Aluminum Company of America ALCOA Laboratories. Methods of and apparatus for producing biaxially oriented polymer product. 4,956,140, Cl. 264-280.000.

Rolls-Royce plc.: *See*—
Coplin, John F., 4,955,565, Cl. 244-199.000.
Drummond, Stephen J.; and Henry, John W., 4,956,786, Cl. 364-474.020.

Romeo, Alfredo: *See*—
Capanna, Dario; Romeo, Alfredo; and Mescia, Luigi, 4,955,508, Cl. 222-94.000.

Romer, Rudolf; Becker, Wilfried; and Bisping, Bernhard, to Rheinmetall GmbH. Ammunition, preferably for use in high-angle fire. 4,955,938, Cl. 102-430.000.

Ronald W. Underdown: *See*—
Underdown, Ronald W., 4,955,362, Cl. 126-540.000.

Roni, Salla: *See*—
Nisafolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.

Rooperol (N.A.) NV: *See*—
Wenteler, George L.; Regel, Karl H.; Drews, Siegfried; and Kundig, Hans, 4,956,502, Cl. 568-729.000.

Rosen, Terry J.: *See*—
Chu, Daniel T.; and Rosen, Terry J., 4,956,475, Cl. 548-557.000.

Rosini, Paolo: *See*—
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.

Rosowsky, Andre, to Dana Farber Cancer Institute, Inc. Desaminoaminopterin and -methotrexate. 4,956,461, Cl. 544-258.000.

Ross-Murphy, Simon B.: *See*—
Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., 4,956,193, Cl. 426-573.000.

Roth, John C., Jr.: *See*—
Robinson, William L.; and Roth, John C., Jr., 4,956,695, Cl. 357-74.000.

Roth, Oscar. Apparatus for subdividing stacks of sheets of paper and the like. 4,955,854, Cl. 225-103.000.

Rothwell, George P.: *See*—
Rothwell, Terrence M.; and Rothwell, George P., 4,955,800, Cl. 425-63.000.

Rothwell, Terrence M.; and Rothwell, George P., to Tampa-Hall Limited. Apparatus for producing prefabricated foam-insulated walls. 4,955,800, Cl. 425-63.000.

Rouffy, Jean-Claude: *See*—
Pribat, Didier; Perret, Joel; Rouffy, Jean-Claude; and Velasco, Gonzalo, 4,956,073, Cl. 204-426.000.

Rouquette, Blandine: *See*—
Chermann, Jean-Claude; Rouquette, Blandine; Rey, Francoise; and Barre-Sinoussi, Francoise, 4,956,292, Cl. 435-235.000.

Rousseau, Tony. Support table for bench saw. 4,955,941, Cl. 108-65.000.

Roxas, Ren: *See*—
Haas, Dave; VanderSyde, Gary; Beatty, Paul; and Roxas, Ren, 4,955,185, Cl. 53-460.000.

Roy, Dhirendra C.; and Hyde, George E., to United Technologies Automotive, Inc. Double-locked subminiature terminal pin with opposed locking openings. 4,955,827, Cl. 439-595.000.

Rozman, Christopher J.: *See*—
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.

Ruano, Miguel M. Volumetric pump for parenteral perfusion. 4,955,860, Cl. 604-67.000.

Ruckman, Paul J.: *See*—
Barber, Harold P.; Lee, Clyde; and Ruckman, Paul J., 4,956,822, Cl. 367-23.000.

Ruebesam, George B. Hazardous waste container with integral hold-down mechanism. 4,955,495, Cl. 220-545.000.

Ruebsam, Klemens: *See*—
Wagner, Wolfgang; Ruebsam, Klemens; Kubic, Helmut; Heimrich, Stefan; Eckert, Klaus; and Pflueger, Werner, 4,956,196, Cl. 427-38.000.

Ruediger, Edward H.: *See*—
Cipollina, Joseph A.; and Ruediger, Edward H., 4,956,368, Cl. 514-254.000.

Ruetman, Sven H.; and Anand, Joginder N., to Dow Chemical Company, The. Bulk polyurethane ionomers. 4,956,438, Cl. 528-60.000.

Ruhlmann, Edmond: *See*—
Lacroix, Roger; and Ruhlmann, Edmond, 4,955,987, Cl. 8-549.000.

Ruisi, Santo J. Method of making roofing plies, including method of applying the same to a roof. 4,956,199, Cl. 427-173.000.

Runciman, Peter J. L.: *See*—
Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. L., 4,956,428, Cl. 526-190.000.

Rupp, Juergen, to Siemens Aktiengesellschaft. Circuit configuration with a generator system for path- or angle-dependent signals. 4,956,566, Cl. 307-261.000.

Ruprecht, Phillip: *See*—
Khanna, Pyare L.; Dworschack, Robert; and Ruprecht, Phillip, 4,956,274, Cl. 435-7.000.

Russel, Matthew J.: *See*—
Allen, James D.; Harris, Calvin E.; Litwiller, Debora M.; and Russel, Matthew J., 4,956,666, Cl. 355-201.000.

Russell, Anthony W.: *See*—
Russell, Michael K.; and Russell, Anthony W., 4,956,823, Cl. 367-84.000.

Russell, Herman F.; and Lynn, Ray E. Information organizer. 4,955,679, Cl. 312-321.500.

Russell, Michael K.; and Russell, Anthony W. Signal transmitters. 4,956,823, Cl. 367-84.000.

Russo, Vincenzo, to SGS-Thomson Microelectronics S.r.L. Method and apparatus for measuring the lifetime on P-N semiconductor junctions by photovoltaic effect. 4,956,603, Cl. 324-158.00D.

Rutherford, David B., to General Signal Corporation. Digital overspeed controller for use in a vital processing system. 4,956,779, Cl. 364-426.050.

Ruttenberg, Gideon. Method and apparatus for converting pressurized low continuous flow to high flow in pulses. 4,955,539, Cl. 239-1.000.

Ryang, Hong-Son: *See*—
Boyd, Jack D.; Sitt, Hermann; Ryang, Hong-Son; and Biermann, Theodore F., 4,956,393, Cl. 521-54.000.

Ryder International Corporation: *See*—
Kanner, Rowland W.; and Williams, Fred E., Jr., 4,956,156, Cl. 422-300.000.

S. C. Johnson & Son, Inc.: *See*—
Lee, Andrew S., 4,956,170, Cl. 424-81.000.

S&K Esterprises, Inc.: *See*—
King, John R., 4,955,743, Cl. 403-254.000.

S-V Technology, Inc: *See*—
Loveness, Harlan K.; and Lewis, Robert P., 4,956,762, Cl. 363-65.000.

Sabadie, Michel: *See*—
Le Fur, Gerard; Bousquet, Michele; Crisafulli, Emilio; and Sabadie, Michel, 4,956,173, Cl. 424-63.000.

Sable, Arthur J.: *See*—
Steiner, Eric L.; and Sable, Arthur J., 4,955,865, Cl. 604-192.000.

Sadeck, James E.: *See*—
Lee, Calvin K.; and Sadeck, James E., 4,955,563, Cl. 244-152.000.

Sadler, Robert A.: *See*—
Griffin, Edward L.; Sadler, Robert A.; and Geissberger, Arthur E., 4,956,308, Cl. 437-41.000.

Saebeler, Walter; and Resnick, Michael. Die cutting apparatus with impressible coating. 4,955,855, Cl. 493-404.000.

Saeki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, to Nihon Parkerizing Co., Ltd. Treatment of chromate coating. 4,956,027, Cl. 148-257.000.

Safr, Paul: *See*—
Brighton, Rich W.; and Safr, Paul, 4,955,157, Cl. 42-77.000.

Sagae, Kyuta: *See*—
Sugiyama, Yoshiaki; and Sagae, Kyuta, 4,955,895, Cl. 606-194.000.

Sagara, Kazuhiko: *See*—
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.

Sahara, Masayoshi: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.

Sahatjian, Ronald: *See*—
Lennox, Charles D.; Noddin, Richard A.; and Sahatjian, Ronald, 4,955,377, Cl. 128-401.000.

Said, Waleed, to Sundstrand Corporation. Diagnostic system for a watchdog timer. 4,956,842, Cl. 371-62.000.

Saino, Tetsushi: *See*—
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.

Saito, Fumiyoshi, to Sanden Corporation. Scroll type fluid displacement apparatus with surface treated spiral element. 4,956,058, Cl. 204-129.350.

Saito, Hiroshi: *See*—
Ashizawa, Masaaki; Nishimoto, Kazuo; and Saito, Hiroshi, 4,956,226, Cl. 428-323.000.
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, to Hitachi, Ltd. System and method of generating a source program from inputted schematic information. 4,956,773, Cl. 364-200.000.

Saito, Ryuichi: *See*—
Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, 4,956,693, Cl. 357-64.000.

Saito, Shinji, to Nitto Kogyo Co., Ltd. Elastic roller and a process for manufacturing the same. 4,956,211, Cl. 428-36.500.

Saito, Shinji: *See*—
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.

Saito, Syuichiro: *See*—
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, 4,956,715, Cl. 358-213.190.

Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, to Mitsubishi Gas Chemical Company, Inc.

Process for producing methanol or mixed alcohol. 4,956,392, Cl. 518-712.000.

Saitoh, Kuniyuki: *See*—
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.

Saitoh, Yoshiyuki: *See*—
Takimoto, Hiroyuki; Kohtani, Yutaka; and Saitoh, Yoshiyuki, 4,956,726, Cl. 360-27.000.

Saizyo, Hidehiko: *See*—
Yokoyama, Kenji; and Saizyo, Hidehiko, 4,955,236, Cl. 73-655.000.

Sakai, Masao: *See*—
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.

Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus forming photomasking pattern on photosensitive medium. 4,956,649, Cl. 346-107.00R.

Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, to Brother Kogyo Kabushiki Kaisha. Apparatus for and method of recording color picture image. 4,956,662, Cl. 355-27.000.

Sakai, Yoshio; and Yamada, Takeshi, to HTC Co., Ltd; and Totoku Electric Co., Ltd. Self-locking knob for adjustable control mechanism. 4,955,253, Cl. 74-553.000.

Sakaki, Mamoru: *See*—
Arai, Ryuichi; Sakaki, Mamoru; and Matsui, Shinya, 4,956,223, Cl. 428-212.000.

Sakaki, Toshiro: *See*—
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, 4,956,375, Cl. 514-361.000.

Sakaki, Yasunori; and Tagomori, Tsutomu, to Strapack Corporation. Method and apparatus for feeding and tightening a band in strapping machine. 4,955,180, Cl. 53-399.000.

Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, to Eagle Industry Co., Ltd. Vane pump with annular ring for engaging vanes and drive means in which the rotor drives the annular ring. 4,955,985, Cl. 418-257.000.

Sakamoto, Keiji; Seki, Shinji; and Iwashita, Yasusuke, to Fanuc Ltd. Servo motor controlling method. 4,956,593, Cl. 318-561.000.

Sakamoto, Masayuki: *See*—
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.

Sakamoto, Tatsuhiko: *See*—
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, 4,956,244, Cl. 429-17.000.

Sakaue, Kunio: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Sakuma, Nobuo: *See*—
Yamaguchi, Katsumi; and Sakuma, Nobuo, 4,955,682, Cl. 350-6.800.

Sakuragi, Hiroyuki: *See*—
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.

Sakuragi, Shoji, to Brother Kogyo Kabushiki Kaisha. Printer with combined data and operating-mode display. 4,955,735, Cl. 400-83.000.

Sakurai, Yoshito: *See*—
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.

Salama, Kamel; and Selvamanickam, Venkatakrishnan, to University of Houston - University Park. Oriented grained Y-Ba-Cu-O superconductors having high critical currents and method for producing same. 4,956,336, Cl. 505-1.000.

Salasoo, Lembit: *See*—
Dorri, Bizhan; Gross, Dan A.; and Salasoo, Lembit, 4,956,608, Cl. 324-319.000.

Salazar, Hermilo Tamez. Electrolytic membrane cells for the production of alkalis. 4,956,069, Cl. 204-257.000.

Salk Institute for Biological Studies, The: *See*—
Baird, Andrew; Bohlen, Peter; Gospodarowicz, Denis; and Ling, Nicholas C., 4,956,455, Cl. 530-399.000.

Samuels, Mark A.; and Dimmick, Stephen, to GEC-Marconi Limited. Image processing apparatus. 4,956,873, Cl. 382-54.000.

Samuelson, Harry V., to Du Pont de Nemours, E. I., and Company. Hollow fibers having curved members projecting therefor. 4,956,237, Cl. 428-398.000.

Sanbayashi, Takeshi: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,956,673, Cl. 355-245.000.

Sanchez, Jose, to Atochem North America, Inc. Amino or hydrazino peroxides, derivatives and their uses. 4,956,416, Cl. 525-327.600.

Sanden Corporation: *See*—
Saito, Fumiyoshi, 4,956,058, Cl. 204-129.350.

Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, to Dow Chemical Company, The. Semipermeable hollow fiber gas separation membranes possessing a non-external discriminating region. 4,955,993, Cl. 55-16.000.

Sandoz Ltd.: *See*—
Bollinger, Pietro; Gubler, Hans U.; and Schnyder, Jorg, 4,956,381, Cl. 514-443.000.

Sandvik Special Metals Corporation: *See*—
Duerring, Anthony A., 4,955,220, Cl. 72-214.000.

Sanghvi, Narendra T.: *See*—
Fry, Francis J.; and Sanghvi, Narendra T., 4,955,365, Cl. 128-24.00A.

Sankei Pharmaceutical Co., Ltd.: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,956,462, Cl. 544-263.000.

Sankrithi, Mithra M. K. V.; and Pelton, Scott L., to Boeing Company, The. Flight path angle command flight control system for landing flare. 4,956,780, Cl. 364-428.000.

Sankyo Manufacturing Company, Ltd.: *See*—
Kato, Heizaburo; and Nishioka, Masao, 4,955,243, Cl. 74-84.00R.
Kato, Heizaburo, 4,955,254, Cl. 74-603.000.

Sano, Hiroyuki: *See*—
Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, 4,956,445, Cl. 528-230.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Inoue, Seiji; and Tanaka, Seiichi, 4,955,831, Cl. 440-1.000.
Suzuki, Tomonori; and Toyohara, Makoto, 4,955,836, Cl. 440-77.000.
Yoshimura, Tsuyoshi, 4,955,837, Cl. 440-88.000.

Sanshu Press Industry Company, Ltd.: *See*—
Tanaka, Haruma, 4,955,133, Cl. 29-892.300.

Sansom, David J.; Willcock, Simon N. M.; and Woolley, Robert A., to Thorn Emi plc. E.A.S. tag having a control component with selectively magnetizeable regions. 4,956,636, Cl. 340-551.000.

Santa Barbara Research Center: *See*—
Cockrum, Charles A.; Barton, Jeffrey B.; and Schulte, Eric F., 4,956,304, Cl. 437-5.000.
de Bruin, Johannes B.; Hewitt, Mary J.; and Phillips, James D., 4,956,687, Cl. 357-30.000.
Hewitt, Mary J.; and de Bruin, Johannes B., 4,956,716, Cl. 358-213.270.

Sanyo Chemical Industries, Ltd.: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Sanyo Electric Co., Ltd.: *See*—
Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, 4,956,248, Cl. 429-194.000.
Moriyama, Masahiro, 4,956,732, Cl. 360-96.300.

Sanyo Electrical Co., Ltd.: *See*—
Urata, Manabu, 4,956,684, Cl. 357-17.000.

Sapse, Alfred T. Protected complex of procaine for the treatment of symptoms from narcotics addiction, tinnitus and alzheimer's disease. 4,956,391, Cl. 514-810.000.

Sarraf, Raymond E.; and Zaharris, Daniel R., to MiniScribe Corporation. Low acoustic noise head actuator. 4,956,831, Cl. 369-32.000.

Sasai, Yoichi: *See*—
Ohnaka, Kiyoshi; Tsujii, Hiraaki; Sasai, Yoichi; and Shibata, Jun, 4,956,682, Cl. 357-16.000.

Sasakawa, Setsuko: *See*—
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.

Sasaki, Chiyoshi: *See*—
Sotani, Junji; and Sasaki, Chiyoshi, 4,955,361, Cl. 126-374.000.

Sasaki, Masahiko: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.

Sasaki, Naoko: *See*—
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, 4,956,375, Cl. 514-361.000.

Sasaki, Shizuo; and Tamaki, Yoshiyuki, to Toyota Jidosha Kabushiki Kaisha. Internal combustion engine. 4,955,339, Cl. 123-295.000.

Sasaki, Shosaku: *See*—
Kaiya, Nobuo; and Sasaki, Shosaku, 4,956,206, Cl. 427-387.000.

Sasaki, Yasushi: *See*—
Ishii, Katsumi; and Sasaki, Yasushi, 4,955,649, Cl. 294-1.100.

Sasano, Akira: *See*—
Tsukada, Toshihisa; Kaneko, Yoshiyuki; and Sasano, Akira, 4,955,697, Cl. 350-332.000.

Sasazawa, Koji: *See*—
Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, 4,956,229, Cl. 428-336.000.

Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, to Toyota Jidosha Kabushiki Kaisha; and Toyo Ink Mfg. Co., Ltd. Quantitative feeding apparatus usable for pulverized and/or granular material and batch type multi-colored automatic feeding apparatus. 4,955,550, Cl. 241-101.400.

Sato, Akira: *See*—
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,956,331, Cl. 502-339.000.

Sato, Ken-ichi: *See*—
Takagi, Kunihiko; Shiraishi, Masazumi; and Sato, Ken-ichi, 4,956,742, Cl. 361-131.000.

Sato, Kozo: *See*—
Tsukase, Masaaki; and Sato, Kozo, 4,956,456, Cl. 534-615.000.

Sato, Masakazu; Koike, Seiichi; Oikawa, Toshihiro; and Ban, Keisuke, to Honda Giken Kogyo Kabushiki Kaisha. Method for producing a rocker arm for use in an internal combustion engine. 4,955,121, Cl. 29-888.200.

Sato, Masashi: *See*—
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.

Sato, Seishiro: *See*—
Ohkase, Wataru; and Sato, Seishiro, 4,955,775, Cl. 414-152.000.

Sato, Shinichi: *See*—
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Sato, Tadashi; and Neki, Shigeo, to Matsushita Electric Industrial Co., Ltd. Sewing machine. 4,955,306, Cl. 112-275.000.

Sato, Yasuhiko: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.

Satoh, Tetsuya: *See*—
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,956,214, Cl. 428-64.000.

Satoo, Susumu: *See*—
Sunagawa, Masao; Jyoraku, Fumio; Ishii, Yoshitaro; and Satoo, Susumu, 4,955,105, Cl. 15-323.000.

Satterfield, Gary T. Portable beverage carrier. 4,955,516, Cl. 224-35.000.

Sattler, Heinz: *See*—
Kossatz, Gert; Heine, Wolfgang; Lempfer, Karsten; and Sattler, Heinz, 4,955,171, Cl. 52-612.000.

Saur, Roland; and Schaper, Rolf, to Behr-Thomson Dehnstoffregler GmbH. Cooling device for an internal combustion engine and method for controlling such a cooling device. 4,955,431, Cl. 165-1.000.

Sauter, Hubert: *See*—
Wenderoth, Bernd; Brand, Siegbert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.

Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, to Nippon Oils & Fats Company, Ltd. Method for manufacture of fluorine-containing aromatic derivatives. 4,956,123, Cl. 260-408.000.

Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, to Hitachi, Ltd. Semiconductor device. 4,956,693, Cl. 357-64.000.

Sawin, Steven P.: *See*—
Jenkins, John M., III; McCullough, James D., Jr.; and Sawin, Steven P., 4,956,427, Cl. 526-62.000.

Sawyer, Linda C., to Hoechst Celanese Corp. Process for dispersing silicon carbide whiskers. 4,956,316, Cl. 501-88.000.

Sawyer, Robert D.: *See*—
Driear, Joseph R., 4,955,955, Cl. 198-318.000.

Sayward, Samuel S., Jr., to Hotwatt Inc. Overheat protected electric cartridge heater. 4,956,544, Cl. 219-335.000.

Schaefer, Stephen H. Utility vehicle. 4,955,451, Cl. 180-213.000.

Schaefer, William L.; and Reese, Walter J., to PPG Industries, Inc. Stationary strand deflector for continuous strand manufacture. 4,955,999, Cl. 65-4.400.

Schafer, Gerhard, to Fritz Schafer Gesellschaft mit beschrankter Haftung. Shelf system, particularly pallet shelf system. 4,955,490, Cl. 211-187.000.

Schako Metallwarenfabrik Ferdinand Schad AG: *See*—
Muller, Gottfried; and Hipp, Paul, 4,955,286, Cl. 98-40.110.

Schall, Roland: *See*—
Reuter, Horst; Quast, Jorn-Rainer; and Schall, Roland, 4,955,588, Cl. 267-140.100.

Schaller, Klaus: *See*—
Ippen, Joachim; Baasner, Bernd; Marhold, Albrecht; Kysela, Ernst; Schaller, Klaus; and von Bittera, Miklos, 4,956,370, Cl. 514-275.000.

Schaper, Rolf: *See*—
Saur, Roland; and Schaper, Rolf, 4,955,431, Cl. 165-1.000.

Schein, Philip S.: *See*—
Talebian, Abdolhossen; Green, Dianna C.; Hammer, Charles F.; and Schein, Philip S., 4,956,459, Cl. 536-121.000.

Schellenberg, Lutz: *See*—
Opitz, Reinhard; and Schellenberg, Lutz, 4,956,016, Cl. 106-14.120.

Scher, Herbert B.; and Rodson, Marius, to ICI Americas Inc. Microencapsulation process. 4,956,129, Cl. 264-4.700.

Schering Aktiengesellschaft: *See*—
Holmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,956,482, Cl. 552-594.000.

Schering Corporation: *See*—
Patel, Mahesh G.; Horan, Ann C.; Marquez, Joseph A.; and Waitz, J. Allan, 4,956,383, Cl. 514-467.000.

Schierbeek, Kenneth L.; Larson, Mark L.; and Schofield, Kenneth, to Donnelly Corporation. Control for a moisture sensor. 4,956,591, Cl. 318-483.000.

Schiessle, Edmund; and Alasafi, Khaldoun, to Daimler-Benz AG. Magnetoelastic force-measuring device. 4,955,241, Cl. 73-862.690.

Schiestl, Werner: *See*—
Klotzer, Wilhelm; Link, Helmut; Mussner, Renate; Schiestl, Werner; and Singewald, Nicolas, 4,956,470, Cl. 548-337.000.

Schildkraut, Jay S.: *See*—
Duo, Phat T.; Scozzafava, Michael; Schildkraut, Jay S.; and Rider, Christopher B., 4,955,977, Cl. 350-96.340.

Schilling, John: *See*—
Robbins, Clyde; and Schilling, John, 4,956,862, Cl. 380-19.000.

Schlak, Ottfried: *See*—
Williams, John L.; Dederichs, Reinhold; Sch'ak, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.

Schlegel Corporation: *See*—
Rogers, Tracy G., 4,955,159, Cl. 49-161.000.

Schlosser, Hans-Joachim; and Gersdorf, Joachim, to Hoechst Aktiengesellschaft. Photosensitive printing plate for waterless offset printing with photosensitive layer of diazonium salt polycondensation product and photopolymerizable composition and overlying silicone rubber layer. 4,956,262, Cl. 430-162.000.

Schlucktebier, Patricia A. Container for food and condiments. 4,955,528, Cl. 229-120.180.

Schmidt, Daniel: *See*—
Feldman, Anita; and Schmidt, Daniel, 4,955,276, Cl. 84-403.000.

Schmidt, Ewald: *See*—
Pfizenmaier, Heinz; and Schmidt, Ewald, 4,956,627, Cl. 336-65.000.

Schmidt, George: *See*—
Lienard, Jean; Haesebrouck, Francis; Katz, Sol; Abolins, Andrew; and Schmidt, George, 4,955,144, Cl. 105-4.200.

Schmidthaler, Johann J.; and Zach, Ronald, to Optyl Eyewear Fashion International Corporation. Composite polymeric spectacle parts. 4,955,706, Cl. 351-41.000.

Schmierer, Quentin G.: *See*—
Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., 4,956,808, Cl. 364-900.000.

Schmit, Paul F.: *See*—
Bayer, Gerald W.; Diamantopoulos, Paul A.; Osterhoudt, Hans W.; and Schmit, Paul F., 4,956,181, Cl. 424-448.000.

Schneider, John R. Slurry mixing apparatus with dry powder conveyer. 4,955,723, Cl. 366-136.000.

Schneider, Rolf: *See*—
Behr, Hans; Vetter, Kurt; Schneider, Rolf; and Luderer, Fred, 4,955,960, Cl. 239-3.000.

Schneider, Siegfried, to Siemens Aktiengesellschaft. Apparatus for stimulation with optical stimuli. 4,955,389, Cl. 128-731.000.

Schnell, Willi: *See*—
Halter, Hartmut; and Schnell, Willi, 4,955,802, Cl. 425-72.100.

Schnorrer, Walter. Method for hindgas coverage in arc welding and hindgas device for carrying-out the method. 4,956,537, Cl. 219-74.000.

Schnyder, Jorg: *See*—
Bollinger, Pietro; Gubler, Hans U.; and Schnyder, Jorg, 4,956,381, Cl. 514-443.000.

Schofield, Kenneth: *See*—
Schierbeek, Kenneth L.; Larson, Mark L.; and Schofield, Kenneth, 4,956,591, Cl. 318-483.000.

Schoonover, Michael W.: *See*—
Chao, Tai-Hsiang; Schoonover, Michael W.; and Stranford, Gerald T., 4,956,329, Cl. 502-251.000.

Schor, Marshall I.: *See*—
Lee, Ho S.; and Schor, Marshall I., 4,956,791, Cl. 364-513.000.

Schornack, Louis W., to Perma Power Electronics, Inc. Standby power supply. 4,956,563, Cl. 307-66.000.

Schrader, Charles R.: *See*—
Keough, James R.; Miller, Arthur E.; and Schrader, Charles R., 4,956,152, Cl. 422-181.000.

Schreuders, Willem J., to Durox Gasbeton B.V. Device for cutting gas concrete. 4,955,272, Cl. 83-425.200.

Schrewe, Hans, to Mannesmann AG. Device for continuous casting of slabs. 4,955,428, Cl. 164-417.000.

Schriewer, Michael; Grohe, Klaus; and Petersen, Uwe, to Bayer Aktiengesellschaft. Quinolone- and 1,8-naphthyridin-4-one-carboxylic acids which are C-bonded in the 7-position. 4,956,465, Cl. 546-156.000.

Schubert, Malvin L.: *See*—
Coleman, John R.; and Schubert, Malvin L., 4,955,197, Cl. 60-547.100.

Schuetz, Franz: *See*—
Wenderoth, Bernd; Brand, Siegbert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.

Schug, Kurt-Peter: *See*—
Hohr, Dieter; Preuss, August-Wilhelm; Schug, Kurt-Peter; and Riegel, Helmut, 4,955,331, Cl. 123-1.00A.

Schulte, Eric F.: *See*—
Cockrum, Charles A.; Barton, Jeffrey B.; and Schulte, Eric F., 4,956,304, Cl. 437-5.000.

Schulte, Josef: *See*—
Focke, Heinz; and Schulte, Josef, 4,955,948, Cl. 131-280.000.

Schulte, Stephen R.; Wissel, Stephen C.; and Wilker, John B., Sr., to Midmark Corporation. Automatically positionable chair. 4,956,592, Cl. 318-560.000.

Schultes, Tilmann: *See*—
Feldmann, Hugo; Schultes, Tilmann; and Beisemann, Gerd, 4,955,221, Cl. 72-247.000.

Schulz, Paul: *See*—
Eierdanz, Horst; Schulz, Paul; von Rybinski, Wolfgang; and Koester, Rita, 4,956,124, Cl. 260-410.000.

Schupp, Eberhard: *See*—
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 4,956,402, Cl. 523-415.000.

Schupphaus, Herbert, to Gebr. Eickhoff Maschinenfabrik u. EisenieBerei mbH. Drum cutter-loader equipped with an auxiliary drum. 4,955,668, Cl. 299-42.000.

Schuster, Ludwig: *See*—
Degner, Dieter; Gramlich, Walter; and Schuster, Ludwig, 4,956,341, Cl. 512-23.000.

Schwabische Huttenwerke GmbH: *See*—
Bayer, deceased; Karl; and Beutler, Hans, 4,955,098, Cl. 14-16.100.
Zaoralek, Heinz-Michael, 4,955,433, Cl. 165-89.000.

Schwarz, Herbert F.: *See*—
Ayub, Abdul L.; and Schwarz, Herbert F., 4,956,398, Cl. 523-209.000.

Schweiberer, Franz. Device for the individual withdrawal of sheet-type printed products, in particular newspapers. 4,955,506, Cl. 221-213.000.

Schweighardt, Frank K.; and Bailey, Webb I., to Air Products and Chemicals, Inc. Gas transport employing perfluorobutyldecalin. 4,956,390, Cl. 514-747.000.

Schwerzel, Thomas: *See*—
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 4,956,402, Cl. 523-415.000.

Schwinn Bicycle Company: *See*—
Hoffenberg, Mark J.; and Walpert, Robert A., 4,955,600, Cl. 272-73.000.

Science Accessories Corp.: *See*—
Sindeband, Seymour J.; and Butler, Robert, 4,956,824, Cl. 367-129.000.

Scivoletto, Joseph C., to Scivoletto, Lisa Maria. Hair dryer attachment. 4,955,145, Cl. 132-271.000.

Scivoletto, Lisa Maria: *See*—
Scivoletto, Joseph C., 4,955,145, Cl. 132-271.000.

Scott, Ernest R.; and Murphy, James C., to Scott Fetzer Company, The. Vacuum cleaner with suction indicator. 4,955,103, Cl. 15-319.000.

Scott Fetzer Company, The: *See*—
Scott, Ernest R.; and Murphy, James C., 4,955,103, Cl. 15-319.000.

Scott, Gerald; Al-Malaika, Sahar; and Ibrahim, Abdul. Bound antioxidant masterbatches. 4,956,410, Cl. 525-73.000.

Scozzafava, Michael: *See*—
Dao, Phat T.; Scozzafava, Michael; Schildkraut, Jay S.; and Rider, Christopher B., 4,955,977, Cl. 350-96.340.

Seaborne, Jonathan, to General Mills, Inc. Solid state ceramic microwave heating susceptor compositions. 4,956,533, Cl. 219-10.55E.

Seagate Technology, Inc.: *See*—
Bezinque, David J.; and Jacques, James O., 4,956,727, Cl. 360-49.000.

Seal, John: *See*—
Harris, Rodney G.; Seal, John; Johnston, Robert L.; and Windham, Marvin R., 4,955,358, Cl. 126-25.00R.

Seal Spout Corporation: *See*—
Brucker, Robert J., 4,955,319, Cl. 119-52.200.

Seale, Mark A.: *See*—
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 4,956,045, Cl. 156-384.000.

Sebastian, S. Andries R.: *See*—
Fryd, Michael; Leberzammer, Ernst; and Sebastian, S. Andries R., 4,956,252, Cl. 430-138.000.

Seden, William E.; Shepherd, David W. J.; and Henderson, Peter, to CooperVision Optics Limited. Contact lens mold. 4,955,580, Cl. 249-82.000.

Sedlacek, Douglas R., to Gates Rubber Company, The. Method of making a power transmission belt including moisturizing and grinding. 4,956,036, Cl. 156-137.000.

Sedlak, Rudolf P., to RD Chemical Company. Composition and process for promoting adhesion on metal surfaces. 4,956,035, Cl. 156-664.000.

See, Jackie R.; and Shell, William E., to Biotechnology, Inc. Kit for preventing or treating arterial dysfunction resulting from angioplasty procedures. 4,955,878, Cl. 604-181.000.

Seefluth, U. C., to U. Christian Seefluth. Cogwheel drive mechanism for aircraft. 4,955,561, Cl. 244-60.000.

Seiichi, Takatsuka; and Kyokuichi, Sato, to OM Industrial Co., Ltd. Fuel fill tube for automobile. 4,955,950, Cl. 141-46.000.

Seiko Epson Corporation: *See*—
Sugai, Hiroshi, 4,955,817, Cl. 439-60.000.

Seiko Instruments: *See*—
Hongo, Yutaka, 4,956,648, Cl. 346-1.100.

Seiko Instruments Inc.: *See*—
Tanaka, Hideo; and Motte, Shunichi, 4,956,680, Cl. 357-4.000.

Seki, Shingo: *See*—
Shinozaki, Kazushi; and Seki, Shingo, 4,956,034, Cl. 156-102.000.

Seki, Shinji: *See*—
Sakamoto, Keiji; Seki, Shinji; and Iwashita, Yasusuke, 4,956,593, Cl. 318-561.000.

Sekida, Minoru: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.

Sekiguchi, Takeshi: *See*—
Shiga, Nobuo; Sekiguchi, Takeshi; and Aga, Keigo, 4,955,683, Cl. 350-96.200.

Sekiguchi, Tomohiro: *See*—
Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, 4,955,681, Cl. 313-495.000.

Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, to Matsushita Electric Industrial Co., Ltd. Image display apparatus having sheet like vertical and horizontal deflection electrodes. 4,955,681, Cl. 313-495.000.

Sekine, Matsuo. Target signal detecting apparatus. 4,956,792, Cl. 364-517.000.

Sekino, Naomi: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, to Fuji Machinery Company Ltd. Vacant package-proofing control device for packaging machine. 4,955,176, Cl. 53-73.000.

Self, Colin H., to Antibody Technology Limited. Secondary antibodies against complexes of small molecules and binding partners therefor, their preparation, and their use in diagnostic methods. 4,956,303, Cl. 436-542.000.

Selva, Enrico: *See*—
Riva, Ernesto; Denaro, Maurizio; Selva, Enrico; Cassani, Giovanni; and Parenti, Francesco, 4,956,293, Cl. 435-253.200.

Selvamanickam, Venkatakrishnan: *See*—
Salama, Kamel; and Selvamanickam, Venkatakrishnan, 4,956,336, Cl. 505-1.000.

Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei, 4,956,339, Cl. 505-1.000.

Senco Products, Inc.: *See*—
Michael, James V., 4,955,521, Cl. 227-3.000.

Sensabaugh, Andrew J., Jr.: *See*—
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.

Sepetka, Ivan, to Target Therapeutics, Inc. Catheter and catheter/guide wire device. 4,955,862, Cl. 604-164.000.

Serafini, Serge: *See*—
Letoffe, Michel; Millet, Claude; and Serafini, Serge, 4,956,436, Cl. 528-18.000.

Servadio, Vittorino: *See*—
Chiesi, Paolo; and Servadio, Vittorino, 4,956,384, Cl. 514-470.000.

Severinsky, Alex J., to Viteq Corporation. High frequency current detector for a low frequency line. 4,956,600, Cl. 324-103.00R.

Sewell, Martha A.: *See*—
Sewell, Virgil L.; and Sewell, Martha A., 4,955,557, Cl. 242-134.000.

Sewell, Virgil L.; and Sewell, Martha A. Handcraft yarn dispenser. 4,955,557, Cl. 242-134.000.

Sexton, Wilson C. Portable insulated carrier. 4,955,480, Cl. 206-528.000.

Seya, Masatomo; Okada, Kazuo; Yoshimura, Motomu; and Maeda, Mitsuo, to Mitsubishi Denki Kabushiki Kaisha. Wavelength selective optical recording and reproducing device. 4,956,812, Cl. 365-119.000.

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SGS-Thomson Microelectronics s.r.l.: *See*—
Gola, Alberto; and Pessina, Gianluigi, 4,956,570, Cl. 307-570.000.
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.
Russo, Vincenzo, 4,956,603, Cl. 324-158.00D.

Shafer, C. Brooks: *See*—
Beaty, Dennis W.; and Shafer, C. Brooks, 4,955,226, Cl. 73-49.300.

Shahraray, Maryam S.: *See*—
Hadavi, Khosrow; and Shahraray, Maryam S., 4,956,784, Cl. 364-468.000.

Shama, Sami A.; Poklacki, Erwin S.; and Zimmerman, John M., to DeSoto, Inc. Ultraviolet-curable cationic vinyl ether polyurethane coating compositions. 4,956,198, Cl. 427-54.100.

Shamb, Aftab: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.

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Asanuma, Masato; Kaneshige, Masatoshi; and Aimoto, Toyoka, 4,955,316, Cl. 118-657.000.
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.
Ozawa, Kazuhito, 4,955,132, Cl. 29-840.000.
Taniguchi, Koki; and Mashiba, Tamaki, 4,955,696, Cl. 350-332.000.
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.

Sharpe, William P.: *See*—
Strange, Andrew H.; and Sharpe, William P., 4,955,818, Cl. 439-66.000.

Sharples, Leonard, to Splicerite Limited. Liquid container and dispenser for controlled liquid dispensation. 4,955,512, Cl. 222-386.500.

Sheard, William G.: *See*—
Ardell, George G.; Geck, Reginald W.; Jenkins, John M., III; and Sheard, William G., 4,956,426, Cl. 526-60.000.

Sheehan, Neil J.: *See*—
Walker, Jack M.; and Sheehan, Neil J., 4,955,863, Cl. 604-165.000.

Shekleton, Jack R., to Sundstrand Corporation. Containment ring for radial inflow turbine. 4,955,192, Cl. 60-39.360.

Shekleton, Jack R.; and Archibald, John P., to Sundstrand Corporation. Fuel injectors for turbine engines. 4,955,201, Cl. 60-738.000.

Shekleton, Jack R.; and Smith, Robert W., to Sundstrand Corporation. Hot gas generator. 4,955,202, Cl. 60-753.000.

Shell Oil Company: *See*—
Gergen, William P.; Lutz, Robert G.; and Hart, William W.C., 4,956,412, Cl. 525-190.000.
Hamilton, David M., Jr.; and Kemp, Richard A., 4,956,516, Cl. 585-646.000.
Mink, Bernardus H., 4,955,989, Cl. 48-197.00R.
Stewart, William B., Jr.; Lau, Henry K.; and Leonardi-Cattolica, Anthony M., 4,956,763, Cl. 364-154.000.

Van Den Akker, Hendrikus E. A., 4,956,091, Cl. 210-512.200.
Shell, William E.: *See*—
See, Jackie R.; and Shell, William E., 4,955,878, Cl. 604-181.000.
Shellhause, Ronald L., to General Motors Corporation. Blind assembly of parking brake cable to parking brake lever. 4,955,458, Cl. 188-2.00D.
Shelyagin, Ivan V.: *See*—
Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A., 4,956,056, Cl. 204-129.430.
Shepard, Michael D.: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
Shepherd, David W. J.: *See*—
Sedens, William E.; Shepherd, David W. J.; and Henderson, Peter, 4,955,580, Cl. 249-82.000.
Sherman, Arthur M.; and Yanker, Peter C., to International Business Machines Corporation. High speed method for data transfer. 4,956,810, Cl. 364-900.000.
Sherwood, William L. Continuous lead-float casting of steel. 4,955,430, Cl. 164-485.000.
Shettigar, Udipi R. Multi-enzyme bioreactor therapy for cancer. 4,955,857, Cl. 604-5.000.
Shiba, Noriyuki: *See*—
Watanabe, Takeni; and Shiba, Noriyuki, 4,956,044, Cl. 156-350.000.
Shibamiya, Akira; and Zimowski, Melvin R., to International Business Machines Corporation. Data base optimizer using most frequency values statistics. 4,956,774, Cl. 364-200.000.
Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, to Mitsubishi Kinzoku Kabushiki Kaisha. Process for recovering gallium trichloride from gallium-containing waste. 4,956,159, Cl. 423-135.000.
Shibata, Hirohumi: *See*—
Kato, Hideo; Shibata, Hirohumi; Matsushita, Keiko; and Takamatsu, Osamu, 4,956,249, Cl. 430-5.000.
Shibata, Hiroshi: *See*—
Hidaka, Sachio; Shibata, Hiroshi; and Yoshimatu, Hideaki, 4,955,283, Cl. 91-447.000.
Shibata, Jun: *See*—
Ohnaka, Kiyoshi; Tsujii, Hirsaki; Sasai, Yoichi; and Shibata, Jun, 4,956,682, Cl. 357-16.000.
Shibata, Makoto: *See*—
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, to Kawasaki Steel Corporation. Process for fusing steel slabs in longitudinal direction thereof. 4,955,126, Cl. 29-527.600.
Shibata, Masato, to Shikoku Kakoki Co., Ltd. Branding device having ceramic type block with embedded electric heating element. 4,956,543, Cl. 219-227.000.
Shibata, Toshihiro; and Kimura, Masaki, to Adeka Argus Chemical Co., Ltd. Optically active cyanobiphenyl compound. 4,956,488, Cl. 558-414.000.
Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, to Minolta Camera Kabushiki Kaisha. Copying magnification setting device for an electrophotographic copying apparatus. 4,956,672, Cl. 355-243.000.
Shida, Yuu: *See*—
Matsuura, Itao; Wakatsuki, Akira; and Shida, Yuu, 4,956,222, Cl. 428-212.000.
Shiga, Nobuo; Sekiguchi, Takeshi; and Aga, Keigo, to Sumitomo Electric Industries, Ltd. Apparatus and a method for coupling an optically operative device with an optical fiber. 4,955,683, Cl. 350-96.200.
Shiga, Nobuo, to Sumitomo Electric Industries, Ltd. Optical module coupling device. 4,955,684, Cl. 350-96.200.
Shigematsu, Toshio: *See*—
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, 4,956,244, Cl. 429-17.000.
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Fuel cell electrode substrate incorporating separator as an intercooler and process for preparation thereof. 4,956,131, Cl. 264-29.500.
Shih, Shan: *See*—
Arzoian, John; Shih, Shan; and Trachman, Edward G., 4,955,851, Cl. 475-59.000.
Shiiki, Zenya: *See*—
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
Shikamori, Tamotu: *See*—
Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotu; and Hirayama, Masayoshi, 4,955,213, Cl. 68-12.00R.
Shikoku Kaken Kogyo Co., Ltd.: *See*—
Motoki, Hideo, 4,956,013, Cl. 106-675.000.
Shikoku Kakoki Co., Ltd.: *See*—
Shibata, Masato, 4,956,543, Cl. 219-227.000.
Shim-A-Line, Inc.: *See*—
Specktor, Gerald A.; and Specktor, John, 4,955,926, Cl. 29-271.000.
Shimadzu Corporation: *See*—
Komoto, Akira, 4,955,240, Cl. 73-862.590.
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, to Fujitsu Limited. Wafer positioning apparatus. 4,955,780, Cl. 414-744.200.
Shimano Industrial Co., Ltd.: *See*—
Nagano, Masashi, 4,955,849, Cl. 474-80.000.
Shimeno, Toshiaki: *See*—
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Basno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, to Canon Kabushiki Kaisha. Surface conduction electron-emitting device. 4,956,578, Cl. 315-3.000.
Shimizu, Hideo: *See*—
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.
Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, to Fuji Electric Co., Ltd. Fuel cell cooling plate. 4,956,245, Cl. 429-26.000.
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, to Toyo Kohan Co., Ltd. Steel foil for drawing container with organic film coat. 4,956,242, Cl. 428-606.000.
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, to Sumitomo Electric Industries, Ltd.; and Kansai Electric Power Co., Inc., The. Apparatus and method for regeserating electrolyte of a redox flow battery. 4,956,244, Cl. 429-17.000.
Shimizu, Shigeo; and Takano, Hiroyuki, to Sankei Pharmaceutical Co., Ltd.; and Nippon Pharmaceutical Development Institute Co., Ltd. "Triazolo-pyrimidine intermediates" . 4,956,462, Cl. 544-263.000.
Shin-Etsu Handotai Co., Ltd.: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
Yamagishi, Hirotoshi; Fusegawa, Izumi; Yokota, Shuuji; and Abe, Takao, 4,956,153, Cl. 422-249.000.
Shin-Etsu Quartz Products Co., Ltd.: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
Shindo, Keijiro: *See*—
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Muksi, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.
Shindoh, Shigeru: *See*—
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.
Shinko Denki Kabushiki Kaisha: *See*—
Iwata, Satoshi; Toida, Akikazu; and Takahashi, Fumio, 4,955,736, Cl. 400-120.000.
Shinohara, Akihito: *See*—
Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, 4,956,539, Cl. 219-121.800.
Shinomiya, Eiichi: *See*—
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
Shinonaga, Hirohiko: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,956,714, Cl. 358-213.110.
Shinozaki, Kazushi; and Seki, Shingo, to Nippon Sheet Glass Co., Ltd. Method and apparatus for manufacturing laminated glass. 4,956,034, Cl. 156-102.000.
Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, to Minolta Camera Kabushiki Kaisha. Photographic camera. 4,956,657, Cl. 354-195.120.
Shioda, Takehiko, to Pioneer Electronic Corporation. Frequency converter for a digital chrominance modulator. 4,956,701, Cl. 358-11.000.
Ship, Arthur G. Tissue forceps. 4,955,897, Cl. 606-210.000.
Shiraishi, Hiroshi: *See*—
Hirata, Mitsuko; Ishikawa, Takeshi; and Shiraishi, Hiroshi, 4,956,052, Cl. 203-19.000.
Shiraishi, Hisashi, to Fuji Photo Film Co., Ltd. Method of detecting radioactive substance. 4,956,559, Cl. 250-484.100.
Shiraishi, Masazumi: *See*—
Takagi, Kunihiko; Shiraishi, Masazumi; and Sato, Ken-ichi, 4,956,742, Cl. 361-131.000.
Shiraishi, Yasunori: *See*—
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Shiraishi, Yoshinobu: *See*—
Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsugu, 4,956,411, Cl. 528-93.000.
Shirasaki, Yoshitsugu; and Torimoto, Yoshiaki, to Kao Corporation. Spherical electrophotographic toner particles comprising carbon and preparation thereof. 4,956,259, Cl. 430-137.000.
Shisko, Walter S., to MacMillan Bloedel Building Materials Limited. Hardboard siding. 4,955,169, Cl. 52-536.000.
Shivar, John R.: *See*—
Todd, E. T., Jr.; and Shivar, John R., 4,955,629, Cl. 280-407.000.

Shizuoka Seiki Co., Ltd.: *See*—
Kuwahara, Yohei; Asaoka, Teruo; Yoshioka, Shogo; and Sugiyama, Haruki, 4,956,060, Cl. 204-129.200.
Shop-Vac Corporation: *See*—
Miller, Jonathan, 4,955,104, Cl. 15-322.000.
Shopsky, Harvey J., to Robertshaw Controls Company. Valve construction and method of making the same. 4,955,583, Cl. 251-11.000.
Shorr, Jacob: *See*—
Pirbazari, Massoud; and Shorr, Jacob, 4,956,093, Cl. 210-616.000.
Shoupe, T. Scott; Coutts, Stephen M.; and Dolby, Lloyd J., to Eurocelitique, S.A. Substituted isoquinolines and methods of using same. 4,956,371, Cl. 514-307.000.
Showa Sangyo Co., Ltd.: *See*—
Kawamata, Yoshio; and Iwai, Kiyoshi, 4,956,125, Cl. 260-412.800.
Shroyer, David, to Lamb-Weston, Inc. Alignment apparatus with gated output for impact alignment of weighed batches of elongated objects. 4,955,178, Cl. 53-148.000.
Shuster, Jerry P.; and Cesaroni, Anthony J., to Du Pont Canada, Inc. Heat exchanger fabricated from polymer compositions. 4,955,435, Cl. 165-170.000.
Siddiqi, Iqbal; and Brochot, Jean, to Battelle Memorial Institute. Analytical method of determining a reduced co-enzyme. 4,956,276, Cl. 435-12.000.
Sidi, Jean A.; and Nogrady, Claude B., to Etat Francais, Centre National d'Etudes des Telecommunications. Wideband server, in particular for transmitting music or images. 4,956,768, Cl. 364-200.000.
Siekmeyer, Josef: *See*—
Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, 4,955,644, Cl. 285-333.000.
Sieloff, Ronald F., to Owens-Corning Fiberglas Corporation. Binder chemistry. 4,956,409, Cl. 524-211.000.
Siemens Aktiengesellschaft: *See*—
Becker, Michael; and Renz, Klaus, 4,956,739, Cl. 361-16.000.
Froese-Peeck, Ruediger; and Poleschinski, Richard, 4,955,680, Cl. 315-382.000.
Hoffmann, Kurt; Oberle, Hans-Dieter; Kraut, Rainer; and Kowarik, Oskar, 4,956,819, Cl. 365-201.000.
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, 4,956,613, Cl. 330-253.000.
Kimpel Rolf-Dieter, 4,956,623, Cl. 335-128.000.
Rupp, Juergen, 4,956,566, Cl. 307-261.000.
Schneider, Siegfried, 4,955,389, Cl. 128-731.000.
Streich, Georg; and Gnahn, Guenter, 4,956,624, Cl. 335-32.000.
Siemens Analytical X-Ray Instruments, Inc.: *See*—
Radtke, Jeffrey L., 4,956,556, Cl. 250-368.000.
Siemens-Bendix Automotive Electronics L.P.: *See*—
Hall, Bryan C., 4,955,230, Cl. 73-204.210.
Siemens Coporate Research, Inc.: *See*—
Hadavi, Khosrow; and Shahraray, Maryam S., 4,956,784, Cl. 364-468.000.
Siemens Transmission Systems, Inc.: *See*—
Berard, Paul M., 4,956,797, Cl. 364-703.000.
SIG Schweizerische Industrie-Gesellschaft: *See*—
Fluck, Rene , 4,955,794, Cl. 414-790.400.
Sigai, A. Gary: *See*—
Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., 4,956,202, Cl. 427-215.000.
Signstrut, Ltd.: *See*—
Tanner, James A., 4,955,928, Cl. 40-603.000.
Sikora, Scott T., to Tomar Electronics, Inc. Strobe trigger pulse generator. 4,956,584, Cl. 315-241.00R.
Silbernagel, Raymond A.: *See*—
Roberts, James T.; and Silbernagel, Raymond A., 4,955,816, Cl. 439-421.000.
Silberstein, Richard B., to Swinburne Limited. Electroencephalographic attention monitor. 4,955,388, Cl. 128-731.000.
Siler, Jimmie R.: *See*—
Calvird, Harry R., II; and Siler, Jimmie R., 4,956,781, Cl. 364-431.040.
Siliconix Incorporated: *See*—
Blanchard, Richard A.; and Williams, Richard K., 4,956,700, Cl. 357-23.400.
Silvestri, George J., Jr.: *See*—
Viscovich, Paul W.; and Silvestri, George J., Jr., 4,955,200, Cl. 60-667.000.
Simmat, Fritz: *See*—
Englisch, Wolfgang; Leber, Helmut; Reimann, Klaus; and Simmat, Fritz, 4,956,059, Cl. 204-130.000.
Simmons, Norman. Sports bottle supporting device. 4,955,572, Cl. 248-312.000.
Simonutti, Paolo; and Speedy, John O. Method and apparatus for guilt detection. 4,955,387, Cl. 128-687.000.
Simonz, John C., to Trak International, Inc. Locking apparatus for skid steer loader. 4,955,452, Cl. 180-271.000.
Sindeband, Seymour J.; and Butler, Robert, to Science Accessories Corp. Position determination apparatus. 4,956,824, Cl. 367-129.000.
Singewald, Nicolas: *See*—
Klotzer, Wilhelm; Link, Helmut; Mussner, Renate; Schiestl, Werner; and Singewald, Nicolas, 4,956,470, Cl. 548-337.000.
Singh, Narsingh B.; Henningsen, Tom; Mazelsky, Robert; Hopkins, Richard H.; and Gottlieb, Milton S., to Westinghouse Electric Corp. Precious metal doped crystals for hardening of the crystals. 4,955,699, Cl. 350-353.000.
Sinto, Roberts: *See*—
Dillon, David M.; Boyer, Michael R.; and Foster, James E., 4,955,291, Cl. 104-299.000.
Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH: *See*—
Neher, Paul, 4,955,211, Cl. 66-9.00R.
SIR International S.A.: *See*—
Quadro, Giuseppe; and Cahn, Jean, 4,956,389, Cl. 514-654.000.
Sissala, Mikko: *See*—
Rintala, Kari; Paarma, Jyrki; and Sissala, Mikko, 4,955,484, Cl. 209-599.000.
Sistonen, Matti. Device for measuring the friction on a surface. 4,955,933, Cl. 73-9.000.
Sitt, Hermann: *See*—
Boyd, Jack D.; Sitt, Hermann; Ryang, Hong-Son; and Biermann, Theodore F., 4,956,393, Cl. 521-54.000.
Sjoberg, Berndt O. H.: *See*—
Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjoberg, Berndt O. H., 4,956,179, Cl. 424-114.000.
Skarupa, Gunter, to Buier & Koppel GmbH & Co. Prazisionsapparate. Drive for a lubrication pump. 4,955,792, Cl. 417-399.000.
Skedelecki, David; and Arakawa, Eric, to Surfco of Hawaii. Water sport board safety tip with attachment facilitating extensions. 4,955,314, Cl. 114-219.000.
SKF Kugellagerfabriken GmbH: *See*—
Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, 4,955,786, Cl. 415-110.000.
Skinner, Richard D.: *See*—
Eastman, Alan D.; Johnson, Marvin M.; and Skinner, Richard D., 4,956,476, Cl. 548-552.000.
Skraastad, Oyvind: *See*—
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Skrycki, Robert R., to JPI Transportation Products, Inc. Gasket. 4,955,621, Cl. 277-166.000.
SKW Trostberg Aktiengesellschaft: *See*—
Weiss, Stefan; Krommer, Helmut; and Neuhauser, Karl-Heinz, 4,956,503, Cl. 564-106.000.
Slocum, D. Barclay. Biradial saw. 4,955,888, Cl. 606-82.000.
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Smart, David C., to Eastman Kodak Company. Film threading apparatus. 4,956,658, Cl. 354-212.000.
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Smetana, Karel: *See*—
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Smialek, Raymond J.: *See*—
Polan, Ned W.; Smialek, Raymond J.; and Menkin, Paul, 4,956,053, Cl. 204-13.000.
Smigel, Richard T.: *See*—
Mills, Nigel G.; Heckendorn, Larry C.; Long, Curtis W.; and Smigel, Richard T., 4,955,441, Cl. 177-255.000.
Smith, Anton K. Sun screening display and advertising device. 4,955,709, Cl. 351-46.000.
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Kenyon, Ian R.; and Smith, Bryan C., 4,956,112, Cl. 252-8.900.
Smith, Bryan K., to Cryo-Chem Inc. Cryogenic bath freezer with pivoted conveyor belt. 4,955,209, Cl. 62-380.000.
Smith, Donald W., to Barber-Greene Company. Shock absorbing device for a paving machine. 4,955,754, Cl. 404-108.000.
Smith, Eric O. M.; Fisher, James; and King, Simon. Skateboards. 4,955,626, Cl. 280-87.042.
Smith, Neil, to Eastman Kodak Company. Thin film magnetic element having a rhombic shape. 4,956,736, Cl. 360-113.000.
Smith, Norman: *See*—
Lawton, Peter G.; and Smith, Norman, 4,955,123, Cl. 29-419.100.
Smith, Patrick J.: *See*—
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Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., to Babcock Display Products, Inc. Gas discharge display device with integral, co-planar, built-in heater. 4,956,573, Cl. 313-15.000.
Smith, Robert D., to Sysmith, Inc. Occurence and value based security system for computer databases. 4,956,769, Cl. 364-200.000.
Smith, Robert W.: *See*—
Shekleton, Jack R.; and Smith, Robert W., 4,955,202, Cl. 60-753.000.
Smith, Stephen L. Wheel suspension linkage. 4,955,634, Cl. 280-675.000.
Smith, Wallace B.; and Giovanni, Dan V., to Electric Power Research Institute, Inc. Process for removal of particulates and SO_2 from combustion gases. 4,956,162, Cl. 423-244.000.
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Feldmann, Hugo; Schultes, Tilmann; and Beisemann, Gerd, 4,955,221, Cl. 72-247.000.
Snelgrove, R. Vernon: *See*—
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,956,235, Cl. 428-368.000.
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Basile, Peter A.; Madan, Ashvani K.; Snyder, Fred E.; and Stillman, Harold M., 4,955,921, Cl. 4-354.000.
Snyder, Richard H., to Brunswick Corporation. Outboard motor retainer. 4,955,963, Cl. 248-640.000.
Sobotowski, Rafal A., to Standard Oil Company. Leading piston engine with two cylinders interconnected through a transfer port. 4,955,328, Cl. 123-51.00R.
Societe a Responsabilite Limitee dite MENSI: *See—*
Paramythioti, Michel, 4,956,552, Cl. 250-236.000.
Societe Anonyme dite: l'Oreal: *See—*
Maignan, Jean; Lang, Gerard; and Malle, Gerard, 4,956,175, Cl. 424-72.000.
Societe Anonyme dite: Societe des Ceramiques Techniques: *See—*
Garcera, Daniel; and Gillot, Jacques, 4,956,087, Cl. 210-321.800.
Societe Anonyme: SANOFI: *See—*
Le Fur, Gerard; Bousquet, Michele; Crisafulli, Emilio; and Sabadie, Michel, 4,956,173, Cl. 424-63.000.
Societe Chimique des Charbonnages S.A.: *See—*
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Societe Electronique de la Region Pays de Loire: *See—*
Gate, Hubert; and Huerre, Dominique, 4,955,815, Cl. 439-350.000.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.: *See—*
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Societe Nationale Elf Aquitaine: *See—*
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Sogli, Loris: *See—*
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Sohie, Guy L.: *See—*
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Solarchem Easterprises Inc.: *See—*
Stevens, R. D. Samuel; and Carter, Stephen R., 4,956,098, Cl. 210-748.000.
Solem, Johndale C.: *See—*
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Erekson, Erek J.; Lee, Asthony L.; Barone, S. Peter; and Solomon, Irvine J., 4,956,327, Cl. 502-216.000.
Soltech, Inc.: *See—*
Mattingly, Bruce W.; and Coates, Roger J., 4,955,474, Cl. 206-320.000.
Sommer, Gerd R., to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Method for production of involute gear tooth flanks. 4,955,163, Cl. 51-287.000.
Sommerfeld, Craig A. Holding fixture for drilling pocket joints. 4,955,766, Cl. 408-87.000.
Song, In W. Sand paper organizer and display rack. 4,955,677, Cl. 312-290.000.
Sonner, Lowell F. Method of making dentures. 4,956,130, Cl. 264-18.000.
Sony Corporation: *See—*
Ohba, Akio, 4,956,706, Cl. 358-93.000.
Sorci, Anthony L., to Container Corporation of America. Five cell partition. 4,955,502, Cl. 220-22.000.
Sorensend, Ole V.: *See—*
Petersen, Jens K.; and Sorensend, Ole V., 4,955,444, Cl. 180-132.000.
Sorkin, Reuben. Condom of thermoplastic elastomer and polyolefin film. 4,955,392, Cl. 128-844.000.
Sotani, Junji; and Sasaki, Chiyoshi, to Furukawa Electric Co., Ltd., The. Hot plate. 4,955,361, Cl. 126-374.000.
Souckova, Dana: *See—*
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Barker, George W.; Crumpler, Michael G.; Peters, James W.; and Hughey, Delmar R., 4,955,216, Cl. 72-10.000.
Spadini, Paolo. Timepiece. 4,956,827, Cl. 368-69.000.
Sparrow, James T.: *See—*
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Specialty Manufacturing Co., Inc.: *See—*
Wicker, James H., 4,956,630, Cl. 340-433.000.
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Bobba, Mohan L., 4,955,693, Cl. 350-319.000.
Spectra Technologies, Inc.: *See—*
Wooda, Robert L., 4,955,547, Cl. 239-589.100.
Spedding, Michael: *See—*
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Speedy, John O.: *See—*
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Spenk, Robert E.; Vazifdar, Pesi A.; and Janowski, John A., Jr., to General Motors Corporation. Remote locomotive spotter control. 4,955,304, Cl. 104-296.000.
Sperber, Axel: *See—*
Juergens, Rainer; and Sperber, Axel, 4,955,438, Cl. 175-40.000.
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Spliceriite Limited: *See—*
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Currie, Sara A.; Miller, Thomas W.; Dulaney, Eugene L.; Springer, James P.; Valiant, Mary E.; Zimmerman, Sheldon B.; and Del Val, Sagrario M., 4,956,294, Cl. 435-252.100.
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Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.
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Maggelet, John, 4,956,750, Cl. 361-415.000.
SSMC Inc.: *See—*
Davidson, Donald R.; Huang, Pao-Ter; and Rogers, H. David, 4,955,152, Cl. 38-36.000.
Staal, Leendert H.; Vis, Jan C.; and Groeneweg, Jan W., to Unilever Patent Holdings B.V. Metal-oxide-silica adsorbent and process for refining oil using the same. 4,956,126, Cl. 260-428.000.
Stabler, Manfred: *See—*
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Stadelmann, Rudolf: *See—*
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Stafford, Steven L.: *See—*
Overton, James R.; Stafford, Steven L.; and Sumner, Charles E., Jr., 4,956,443, Cl. 528-206.000.
Stahrli, Paul; Demuth, Robert; and Fritzsche, Peter, to Rieter Machine Works Ltd. Apparatus for detecting the density or thickness and variations thereof of fiber material at the infeed of a textile machine as well as for evening the density of thickness variations of fiber material at the infeed of a textile machine. 4,955,266, Cl. 19-105.000.
Stain, Donald B.: *See—*
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Stale, Heggo: *See—*
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Stalnaker, Thomas A.: *See—*
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Standard Oil Company: *See—*
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Stanislawczyk, Vic, to B. F. Goodrich Company, The. Rubbery carboxylated acrylate polymer, latex, and preparation thereof. 4,956,434, Cl. 526-318.200.
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Stastny, Milos: *See—*
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Staszewski, Edward T.; Reynolds, Steve J.; Vinyard, Richard C.; and Galloway, Bennie E., to Advanced Pulver Systems, Inc. Apparatus for unstacking cross-nested articles. 4,955,784, Cl. 414-796.400.
Stauffer, Harold F., Jr.: *See—*
Taylor, Chandler R., Jr.; Cale, Albert D., Jr.; and Stauffer, Harold F., Jr., 4,956,359, Cl. 514-210.000.
STC PLC: *See—*
Jones, Roger E.; Hale, Peter G.; and Willson, Jolyon P., 4,955,238, Cl. 73-800.000.
Steck, Arnold, to Buchi Laboratoriums-Technik AG. Device for holding together and releasing conical joints. 4,956,151, Cl. 422-103.000.
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Stefan, Alexander. Zero gravity toilet. 4,955,090, Cl. 4-316.000.
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Stehr, Werner. Measuring device with a test tape cassette. 4,955,934, Cl. 73-862.340.

Stein & Co. GmbH: *See*—
Stein, Klaus; and Kaulig, Heinz, 4,955,106, Cl. 15-335.000.
Stein, Klaus; and Kaulig, Heinz, to Stein & Co. GmbH. Upright vacuum cleaner. 4,955,106, Cl. 15-335.000.
Steiner, Eric L.; and Sable, Arthur J., to On-Gard Systems, Inc. Needle unsheathing, resheathing and handling apparatus. 4,955,865, Cl. 604-192.000.
Steinman, Gerald W. Method of forming a pizza grill. 4,955,125, Cl. 29-509.000.
Steinmeyer, Robert D.: *See*—
Marko, Ollie W.; and Steinmeyer, Robert D., 4,956,486, Cl. 556-466.000.
Stellar Computer, Inc.: *See*—
Stephenson, R. Ashley, 4,956,767, Cl. 364-200.000.
Stephens, Joseph H. Violins. 4,955,274, Cl. 84-275.000.
Stephenson, R. Ashley, to Stellar Computer, Inc. Data processing system with model for status accumulating operation by simulating sequence of arithmetic steps performed by arithmetic processor. 4,956,767, Cl. 364-200.000.
Steppan, Hartmut: *See*—
Geisler, Ulrich; Steppan, Hartmut; and Herwig, Walter, 4,956,264, Cl. 430-281.000.
Stepper, Inc.: *See*—
Hannon, Charles N., 4,955,594, Cl. 270-58.000.
Stern, Donald J.; Heaton, Jeff S.; Tryon, James A.; and Bartholmey, Brett A., to DJS&T Limited Partnership. Manually adjustable spray applicator. 4,955,545, Cl. 239-320.000.
Stevens, Jeffrey G. Simplified apparatus for intensified magnetic treatment of liquids. 4,956,084, Cl. 210-222.000.
Stevens, R. D. Samuel; and Carter, Stephen R., to Solarchem Enterprises Inc. Oxidation and photoxidation process. 4,956,098, Cl. 210-748.000.
Stevens, S. Edward, Jr.: *See*—
Buzby, Jeffrey S.; Porter, Ronald D.; and Stevens, S. Edward, Jr., 4,956,280, Cl. 435-69.100.
Stewart, Harry D.: *See*—
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Stewart & Stevenson Services, Inc.: *See*—
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Stewart, William B., Jr.; Lau, Henry K.; and Leonardi-Cattolica, Anthony M., to Shell Oil Company. Portable self-contained surge level controller. 4,956,763, Cl. 364-154.000.
Stickel, Jeffrey T.: *See*—
Kifer, Edward W.; Wojtyna, Vincent J.; Colton, James P.; and Stickel, Jeffrey T., 4,956,394, Cl. 521-84.100.
Stillman, Harold M.: *See*—
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Stodd, Ralph P.; and Stewart, Harry D., to Formatec Tooling Systems, Inc. Method and apparatus for forming a can shell. 4,955,223, Cl. 72-336.000.
Stolle Research & Development Corporation: *See*—
Beck, Lee R., 4,956,349, Cl. 514-54.000.
Storz Instrument Company: *See*—
Zirm, Mathias, 4,955,887, Cl. 606-107.000.
Storz Medical AG: *See*—
Hagelauer, Ulrich, 4,955,143, Cl. 33-652.000.
Stotler, James G.; and Lowe, Dennis G. System for simulating the appearance of the night sky inside a room. 4,955,714, Cl. 353-62.000.
Straight, Michael R.; and Raum, Jack R., to Ashworth Bros., Inc. Endless flexible conveyor belt and stacker plates therefor. 4,955,465, Cl. 198-778.000.
Stranford, Gerald T.: *See*—
Chao, Tsi-Hsiang; Schoonover, Michael W.; and Stranford, Gerald T., 4,956,329, Cl. 502-251.000.
Strange, Andrew H.; and Sharpe, William P., to Elastomeric Technologies, Inc. Electrical component connector. 4,955,818, Cl. 439-66.000.
Strapack Corporation: *See*—
Sakaki, Yasunori; and Tagomori, Tsutomu, 4,955,180, Cl. 53-399.000.
Strasilla, Dieter: *See*—
Bernheim, Michael; Strasilla, Dieter; De Sousa, Bernardo; and Rohringer, Peter, 4,956,049, Cl. 162-158.000.
Streich, Georg; and Gnahn, Guenter, to Siemens Aktiengesellschaft. Auxiliary switch attachment block. 4,956,624, Cl. 335-32.000.
Streiff, Paul J.; Hoyda, David L.; and Epstein, Edward, to Borden, Inc. Process for the production of low calorie yogurt. 4,956,186, Cl. 426-43.000.
Streitberger, Hans J.: *See*—
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Strick Corporation: *See*—
Lienard, Jean; Haesebrouck, Francis; Katz, Sol; Abolins, Andrew; and Schmidt, George, 4,955,144, Cl. 105-4.200.
Strittzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, to TMC Corporation. Adjusting device for a ski binding. 4,955,633, Cl. 280-633.000.
Strobl, Georg, to Johnson Electric S.A. Commutator for an electric motor. 4,956,572, Cl. 310-233.000.
Stucki, Samuel; and Winkler, Dieter, to Asea Brown Boveri Ltd. Process for complete removal of nitrites and nitrates from an aqueous solution. 4,956,057, Cl. 204-101.000.
Stuhler, Helmut, to Hoechst CeramTec Aktiengesellschaft. Process for the leakproof joining of ceramic sealing disks to metallic attachments. 4,955,522, Cl. 228-122.000.
Stumpf, Donald M.: *See*—
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Su, Chung-Yi; Ty Tan, Michael R.; and Anklam, William J., to Hewlett-Packard Company. Monolithic sampler. 4,956,568, Cl. 307-352.000.
Sub-Zero Freezer Company, Inc.: *See*—
Hottmann, Philip F., 4,955,569, Cl. 248-188.200.
Suda, Nobuyuki, Fujimoto, Akihiko; and Suzuki, Ryuji, to Fanuc Ltd. Automatic tool exchanging device for a machine tool. 4,955,127, Cl. 29-568.000.
Sudharto, V. Widadi: *See*—
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Sudoma, A. Louis, to Chr. Hansen's Laboratory, Inc. Stabilization of dried bacteria extended in particulate carriers. 4,956,295, Cl. 435-252.100.
Suemitsu, Yuji: *See*—
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Suenaga, Nobuyoshi: *See*—
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Sueyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, to Hitachi Maxell, Ltd. Magnetic recording medium. 4,956,220, Cl. 428-141.000.
Sugai, Hiroshi, to Seiko Epson Corporation. Construction for removing electronic charges in connectors. 4,955,817, Cl. 439-60.000.
Sugata, Takeshi: *See*—
Kataoka, Yoshikazu; Wakimoto, Zenji; and Sugata, Takeshi, 4,955,701, Cl. 350-481.000.
Sugata, Yoshinobu: *See*—
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Sugawara, Toshio: *See*—
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.
Sugiyama, Haruki: *See*—
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Sugiyama, Yoshiaki; and Sagae, Kyuta, to Terumo Kabushiki Kaisha. Vasodilating catheter. 4,955,895, Cl. 606-194.000.
Sulc, Jiri; Krcova, Zuzana; Smetana, Karel; and Pitrova, Sarka, to Ceskoslovenska Akademie Ved, CSX. Soft intracameral lens. 4,955,903, Cl. 623-6.000.
Sulzbacher, Horst; and Hubig, Markus, to Korf Engineering GmbH. Arrangement for recovering molten pig iron or steel pre-products from lumpy iron-oxide containing charging substances. 4,955,587, Cl. 266-156.000.
Sulzer Brothers Limited: *See*—
Frey, Otto; and Koch, Rudolf, 4,955,908, Cl. 623-17.000.
Frey, Otto; and Koch, Rudolf, 4,955,911, Cl. 623-16.000.
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Sulzer-Escher Wyss GmbH: *See*—
Ickinger, Georg; Fermuller, Willibald; Paugger, Anton; and Pinter, Reinhard, 4,955,268, Cl. 29-130.000.
Sumitomo Chemical Company, Limited: *See*—
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Sumitomo Electric Industries, Ltd.: *See*—
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Sumitomo Heavy Industries, Ltd.: *See*—
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Sumitomo Rubber Industries, Ltd.: *See*—
Igarashi, Yasuo, 4,955,417, Cl. 152-454.000.
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
Takeuchi, Akihiro; and Koyama, Toshio, 4,955,415, Cl. 152-209.00R.
Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshikawa, Hideaki, 4,955,416, Cl. 152-454.000.
Sumitomo Seika Chemicals Co., Ltd.: *See*—
Ueda, Kanji; Haruna, Kazuo; and Inoue, Masahiro, 4,955,998, Cl. 55-16.000.
Summers, William F.: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hust, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
Sumner, Charles E., Jr.: *See*—
Overton, James R.; Stafford, Steven L.; and Sumner, Charles E., Jr., 4,956,443, Cl. 528-206.000.
Sun, Anthony M.: *See*—
Hommel, Martin; Sun, Anthony M.; and Goosen, Mattheus F. A., 4,956,128, Cl. 264-4.000.
Sun Microsystems, Inc.: *See*—
Garman, Jonathan D., 4,955,685, Cl. 350-96.300.

Priem, Curtis; and Malachowsky, Chris, 4,956,801, Cl. 364-748.000.
Priem, Curtis, 4,956,802, Cl. 364-787.000.
Sun Refining and Marketing Company: *See*—
Hollstein, Elmer J.; Wei, James T.; and Hsu, Chao-Yang, 4,956,519, Cl. 585-751.000.
Sunagawa, Masao; Jyoraku, Fumio; Ishii, Yoshitaro; and Satoo, Susumu, to Hitachi, Ltd. Vacuum cleaner. 4,955,105, Cl. 15-323.000.
Sundaresan, Ravishankar: *See*—
Pollack, Gordon P.; Matloubian, Mishel; and Sundaresan, Ravishankar, 4,956,307, Cl. 437-40.000.
Sundberg, Jukka; and Martin, Bror, to Electrolux Autoliv AB. Safety installation for carrying children. 4,955,636, Cl. 280-749.000.
Sundhar, Shaam P. Air conditioner for parked automotive vehicle. 4,955,203, Cl. 62-361.000.
Sunds Defibrator AB: *See*—
Guggenberger, Erich; and Hoden, Ebbe, 4,955,217, Cl. 72-134.000.
Sunds Defibrator Aktiebolag: *See*—
Reinhall, Rolf B., 4,955,549, Cl. 241-80.000.
Sundstrand Corporation: *See*—
Cohen, Mordechai, 4,955,785, Cl. 415-26.000.
Hoppe, Richard J.; and Metzler, Mark W., 4,956,626, Cl. 336-60.000.
Hoppe, Richard J.; Jackson, Steven E.; and Anderson, William K., 4,956,696, Cl. 357-79.000.
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.
Said, Waleed, 4,956,842, Cl. 371-62.000.
Shekleton, Jack R., 4,955,192, Cl. 60-39.360.
Shekleton, Jack R.; and Archibald, John P., 4,955,201, Cl. 60-738.000.
Shekleton, Jack R.; and Smith, Robert W., 4,955,202, Cl. 60-753.000.
Suno, Masahiro: *See*—
Aoso, Tetsuya; Suno, Masahiro; and Kito, Go, 4,956,360, Cl. 514-215.000.
Sunseri, Ronald H.; and O'Rourke, Michael W., to Copolymer Rubber & Chemical Corporation. Polyesters having improved impact strength. 4,956,301, Cl. 525-64.000.
Suntory Limited: *See*—
Hirata, Mitsuho; Ishikawa, Takeshi; and Shiraishi, Hiroshi, 4,956,052, Cl. 203-19.000.
Supra, Carl F. W., to Liberty Pool Products S. A. Movable support. 4,955,099, Cl. 15-1.700.
Surfco of Hawaii: *See*—
Skedeleski, David; and Arakawa, Eric, 4,953,314, Cl. 114-219.000.
Suwa, Takeshi: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Suwa, Takeshi, 4,956,703, Cl. 358-76.000.
Suzue, Masayoshi: *See*—
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.
Suzuki, Hidetoshi: *See*—
Shimizu, Akira; Suzuki, Hidetoshi; Okuzuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Basno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.
Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Tokuda, Teruhiko; Ishihara, Koji; Maruyama, Masahiko; and Wada, Manabu, 4,955,409, Cl. 137-561.00A.
Suzuki, Kazuaki; Maruzesi, Shoji; Nakai, Eiji; and Nezu, Toru, to Asahi Denka Kogyo Kabushiki Kaisha. Process for producing oleaginous composition. 4,956,287, Cl. 435-134.000.
Suzuki, Kenji; Hatazawa, Kikuo; and Kishi, Shinichi, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Method of and apparatus for controller duplex page printer. 4,956,717, Cl. 358-296.000.
Suzuki, Kenji: *See*—
Ito, Yasunobu; and Suzuki, Kenji, 4,955,258, Cl. 74-866.000.
Suzuki, Kensei: *See*—
Kashima, Mitsuhiro; and Suzuki, Kensei, 4,955,730, Cl. 38.4-101.000.
Suzuki, Makoto: *See*—
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.
Suzuki Motor Company Ltd.: *See*—
Kosugi, Toshio, 4,955,659, Cl. 296-146.000.
Suzuki, Norihiko: *See*—
Takano, Yoshiaki; and Suzuki, Norihiko, 4,956,679, Cl. 355-326.000.
Suzuki, Ryuji: *See*—
Suda, Nobuyuki; Fujimoto, Akihiko; and Suzuki, Ryuji, 4,955,127, Cl. 29-568.000.
Suzuki, Shigeki: *See*—
Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, 4,955,176, Cl. 53-73.000.
Suzuki, Sirou: *See*—
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
Suzuki, Takashi: *See*—
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.
Suzuki, Teruo: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Suwa, Takeshi, 4,956,703, Cl. 358-76.000.
Suzuki, Tomonori; and Toyohara, Makoto, to Sanshin Kogyo Kabushiki Kaisha. Outboard motor. 4,955,836, Cl. 440-77.000.
Suzuki, Yasuo: *See*—
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Eii, 4,956,474, Cl. 548-475.000.
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, to Takenaka Corp; and Tokyo Soil Research Co., Ltd. Method and apparatus for measurement of in-situ horizontal stress by freezing of the ground in-situ. 4,955,237, Cl. 73-784.000.
Suzuki, Yuji; Urano, Satoshi; Umemoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, to Nippon Paint Co., Ltd. Alpha-alkylacrylamide derivatives and their polymers. 4,956,491, Cl. 560-172.000.
Swaminathan, Kumar, to AT&T Bell Laboratories. Improving sub-band coding of speech at low bit rates by adding residual speech energy signals to sub-bands. 4,956,871, Cl. 381-31.000.
Swanson, Alfred B. Lunate implant and method of stabilizing same. 4,955,915, Cl. 623-21.000.
Swantner, Richard L.: *See*—
Foote, Wayne E.; and Swantner, Richard L., 4,956,735, Cl. 360-106.000.
Swift Instruments, Inc.: *See*—
Hayashi, George, 4,955,978, Cl. 350-523.000.
Swihart, Terence J.: *See*—
Lo, Sunny J.; Swihart, Terence J.; and Ward, Andrew H., 4,956,472, Cl. 548-406.000.
Swinburne Limited: *See*—
Silberstein, Richard B., 4,955,388, Cl. 128-731.000.
Swinkels, Johannes M. M.: *See*—
Dona, Marinus J. J.; and Swinkels, Johannes M. M., 4,955,937, Cl. 82-1.110.
Swiokla, Joyce L.: *See*—
Mehrotra, Pankaj K.; Swiokla, Joyce L.; and Billman, Elizabeth R., 4,956,315, Cl. 501-87.000.
Sy/Lert System Ltd.: *See*—
Bernstein, Bernard; and Sohie, Guy L., 4,956,866, Cl. 381-43.000.
Syntex (U.S.A.) Inc.: *See*—
Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, 4,956,365, Cl. 514-233.200.
Syntth, Inc.: *See*—
Smith, Robert D., 4,956,769, Cl. 364-200.000.
Szabo, Georges: *See*—
Gouzard, Jean P.; and Szabo, Georges, 4,956,322, Cl. 502-62.000.
Szalanski, Scott E.: *See*—
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.
Szalla, Frank J.: *See*—
Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.
Ta Triumph Adler Aktiengesellschaft: *See*—
Haftmann, Johannes; and Haczek, Werner, 4,955,737, Cl. 400-208.000.
Tabak, Samuel A.: *See*—
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
Tachi, Shinichi: *See*—
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic material having improved antistatic and antiblocking properties. 4,956,270, Cl. 430-527.000.
Tada, Hisashi; Shiraishi, Yoshinobu; and Hayashi, Shigetsugu, to Mitsubishi Rayon Company, Ltd. Epoxy resin composition for composite material from m- or o-substituted triglycidylaminophenols, diaminodiphenylsulfone and latent curing agents. 4,956,411, Cl. 528-93.000.
Tadlock, John W.: *See*—
Thomsen, Jack W.; Regunathan, Perialwar; and Tadlock, John W., 4,956,086, Cl. 210-232.000.
Taga, Yutaka: *See*—
Kashihara, Yuji; Iwatsuki, Kunihiro; and Taga, Yutaka, 4,955,256, Cl. 74-866.000.
Tagawa, Itsuo, to Tagawakougyou Co. Ltd. Working machine. 4,955,961, Cl. 241-264.000.
Tagawakougyou Co. Ltd.: *See*—
Tagawa, Itsuo, 4,955,961, Cl. 241-264.000.
Tagomori, Tsutomu: *See*—
Sakaki, Yasunori; and Tagomori, Tsutomu, 4,955,180, Cl. 53-399.000.
Taguchi, Masao: *See*—
Yokoyama, Naoki; and Taguchi, Masao, 4,956,681, Cl. 357-4.000.
Tai, Hiromichi: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
Tai, William K. Golf swing training aid. 4,955,612, Cl. 273-200.00B.
Taira, Taketoshi: *See*—
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuza, Nobuhiko, 4,956,025, Cl. 148-12.00C.
Taiyo Kikai Ltd.: *See*—
Ohta, Hirotake, 4,955,299, Cl. 101-143.000.
Tajima, Kenji: *See*—
Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.
Takagi, Kunihiko; Shiraishi, Masazumi; and Sato, Ken-ichi, to Kabushiki Kaisha Toshiba. Switch gear. 4,956,742, Cl. 361-131.000.

Takagi, Yoshihiro: *See*—
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.

Takahara, Takeshi: *See*—
Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fukuo, 4,955,191, Cl. 60-39.300.

Takahashi, Akira: *See*—
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.

Takahashi, Fumio: *See*—
Iwata, Satoshi; Toida, Akikazu; and Takahashi, Fumio, 4,955,736, Cl. 400-120.000.

Takahashi, Hiroo: *See*—
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.

Takahashi, Hiroto: *See*—
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.

Takahashi, Katsutoshi: *See*—
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.

Takahashi, Koji: *See*—
Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, 4,956,725, Cl. 360-14.300.

Takahashi, Masakatsu. Wigs. 4,955,400, Cl. 132-56.000.

Takahashi, Masami: *See*—
Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, 4,956,446, Cl. 528-272.000.

Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, to Unitika Limited. Polyester fiber with low heat shrinkage. 4,956,446, Cl. 528-272.000.

Takahashi, Yoshiharu, to Konica Corporation. Focus detecting apparatus for camera. 4,956,660, Cl. 354-402.000.

Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, to Oji Paper Co., Ltd. Heat-sensitive recording material. 4,956,332, Cl. 503-209.000.

Takamatsu, Osamu: *See*—
Kato, Hideo; Shibata, Hirohumi; Matsushita, Keiko; and Takamatsu, Osamu, 4,956,249, Cl. 430-5.000.

Takamiya, Tadashi: *See*—
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.

Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, to Victor Company of Japan, Ltd. Image pick-up apparatus using photo-to-photo conversion element. 4,956,713, Cl. 358-209.000.

Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Image pickup apparatus. 4,956,714, Cl. 358-213.110.

Takano, Hiroyuki: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,956,462, Cl. 544-263.000.

Takano, Yoshiaki; and Suzuki, Norihiko, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 4,956,679, Cl. 355-326.000.

Takao, Itaru: *See*—
Narushima, Masaki; and Takao, Itaru, 4,955,590, Cl. 269-21.000.

Takasaki, Yoshiyuki: *See*—
Yamanobe, Takashi; Mitsuishi, Yasushi; and Takasaki, Yoshiyuki, 4,956,291, Cl. 435-200.000.

Takashima, Kouichi: *See*—
Kitsura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.

Takauji, Kiyomi, to Kabushiki Kaisha Kawai Gakii Seisakusho. Optimization of waveform operation in electronic musical instrument. 4,955,278, Cl. 84-605.000.

Takayama, Syuichi: *See*—
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Takayanagi, Takeo. Disazo disulfonamides compounds. 4,956,457, Cl. 534-643.000.

Takeda Chemical Industries, Ltd.: *See*—
Aono, Tetsuya; Suno, Masahiro; and Kito, Go, 4,956,360, Cl. 514-215.000.
Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, 4,956,358, Cl. 514-202.000.

Takeda, Junichi: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.

Takeda, Toshihiko: *See*—
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.

Takeda, Toshio, to Aisin Seiki Kabushiki Kaisha. Combined supercharger and supercharger coolant pump for an internal combustion engine. 4,955,352, Cl. 123-559.100.

Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, to Hi-Silicon Co., Ltd. Method and apparatus for cutting polycrystalline silicon rods. 4,955,357, Cl. 125-23.010.

Takehisa, Fumitaka; Kondoh, Fumio; and Yokoi, Mitsuyoshi, to Nippondenso Co., Ltd. Die-casting method and device. 4,955,424, Cl. 164-72.000.

Takenaka Corp: *See*—
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, 4,955,237, Cl. 73-784.000.

Takenaka Komuten Co., Ltd.: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Takenaka, Shinji: *See*—
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Katsita, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.

Takeuchi, Akihiro; and Koyama, Toshio, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire with groove platforms to prevent stone entrapment. 4,955,415, Cl. 152-209.00R.

Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshikawa, Hideaki, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire carcass profile. 4,955,416, Cl. 152-454.000.

Takeuchi, Akira: *See*—
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 4,956,783, Cl. 364-468.000.

Takeuchi, Hideaki: *See*—
Nakada, Junji; and Takeuchi, Hideaki, 4,956,070, Cl. 204-298.180.

Takeuchi, Hirofumi: *See*—
Tsutsui, Osamu; Haraga, Hisato; Arita, Kinya; Makita, Atsuo; Takeuchi, Hirofumi; and Tsukada, Ryoichi, 4,955,535, Cl. 236-12.120.

Takeuchi, Kunio: *See*—
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.

Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased (by Umezawa, Mieko, Kazuo Umezawa, Yoji Umezawa, adminstrators), to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Novel spergualin-related compounds and process for producing the same. 4,956,504, Cl. 564-153.000.

Takeuchi, Yo: *See*—
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, 4,955,525, Cl. 228-183.000.

Takeya, Kunio: *See*—
Akimoto, Haruo; and Takeya, Kunio, 4,955,426, Cl. 164-314.000.

Takigawa, Akio: *See*—
Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shiraishi, Yasunori, 4,956,227, Cl. 428-331.000.

Takimoto, Hiroyuki; Kohtani, Yutaka; and Saitoh, Yoshiyuki, to Canon Kabushiki Kaisha. Information signal reproducing apparatus in which control signal condition and information signal level are varied so as to correspond. 4,956,726, Cl. 360-27.000.

Takishima, Suguru: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.

Takizawa, Koichi: *See*—
Ueda, Shinji; and Takizawa, Koichi, 4,956,191, Cl. 426-330.300.

Talbert Fuel Systems, Inc.: *See*—
Talbert, William L., 4,955,332, Cl. 123-1.00A.

Talbert, William L., to Talbert Fuel Systems, Inc. Method of improving fuel combustion efficiency. 4,955,332, Cl. 123-1.00A.

Talebian, Abdolhossen; Green, Dianna C.; Hammer, Charles F.; and Schein, Philip S., to Georgetown University. Platinum compounds suitable for use as pharmaceuticals. 4,956,459, Cl. 536-121.000.

Talley, William. Single piece wedge clamp. 4,955,591, Cl. 269-217.000.

Tam, Gordon; Legge, Ronald N.; and Paulson, Wayne M., to Motorola, Inc. Differential etching of silicon nitride. 4,956,314, Cl. 437-241.000.

Tam, Simon M.: *See*—
Holler, Mark A.; Tam, Simon M.; and Castro, Hernan A., 4,956,564, Cl. 307-201.000.

Tamaki, Yoshiyuki: *See*—
Sasaki, Shizuo; and Tamaki, Yoshiyuki, 4,955,339, Cl. 123-295.000.

Tamamushi, Takashige: *See*—
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.

Tamer, Antanios B., to Caterpillar Inc. Smart power connector. 4,956,561, Cl. 307-10.100.

Tampa-Hall Limited: *See*—
Rothwell, Terrence M.; and Rothwell, George P., 4,955,800, Cl. 425-63.000.

Tamura, Kenshiro: *See*—
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.

Tamura, Susan Y.; and Asato, Goro, to American Cyanamid Company. 23-deoxy-27-chloro derivatives of LL-F28249 compounds. 4,956,479, Cl. 549-264.000.

Tamura, Tomoyuki: *See*—
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,956,214, Cl. 428-64.000.

Tan, Thiam C.: *See*—
Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., 4,956,444, Cl. 528-220.000.

Tanabe, Junichi: *See*—
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.

Tanabe, Kazunori: *See*—
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.
Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, 4,956,662, Cl. 355-27.000.

Tanaka, Akihiro: *See*—
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.

Tanaka, Haruma, to Sanshu Press Industry Company, Ltd. Method of making pulleys with plural V-shaped grooves. 4,955,133, Cl. 29-892.300.

Tanaka, Hideo; and Motte, Shunichi, to Seiko Instruments Inc. Thin film transistor. 4,956,680, Cl. 357-4.000.

Tanaka, Hirokazu: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.

Tanaka, Hozumi: *See*—
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.

Tanaka Kikinzoku Kogyo K.K.: *See*—
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,956,331, Cl. 502-339.000.

Tanaka, Kohbun, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Buckle device. 4,955,115, Cl. 24-641.000.

Tanaka, Koosuke: *See*—
Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Tanaka, Masato; and Machida, Shuji, to Idemitsu Kosan Company Limited. Ionomer resin and preparation of same. 4,956,418, Cl. 525-330.600.

Tanaka, Seiichi: *See*—
Inoue, Seiji; and Tanaka, Seiichi, 4,955,831, Cl. 440-1.000.

Tanaka, Sumio: *See*—
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.

Tanashin Denki Co., Ltd.: *See*—
Yoshimura, Toshio, 4,956,731, Cl. 360-96.300.

Tandon Corporation: *See*—
Dalziel, Warren L., 4,956,733, Cl. 360-105.000.

Tang, Jiunn-Yann: *See*—
Johnson, Robert R.; and Tang, Jiunn-Yann, 4,955,397, Cl. 131-194.000.

Taniguchi, Katsutoshi: *See*—
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, 4,955,189, Cl. 57-207.000.

Taniguchi, Koki; and Mashiba, Tamaki, to Sharp Kabushiki Kaisha. Liquid crystal driving system. 4,955,696, Cl. 350-332.000.

Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, to Minolta Camera Kabushiki Kaisha. Camera system. 4,956,661, Cl. 354-412.000.

Taniguchi, Nobuyuki: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.

Taniguchi, Toshihiko: *See*—
Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, 4,956,657, Cl. 354-195.120.

Tanikawa, Keiichi; and Yuzo, Higaki, to Nisshin Oil Mills, Ltd., The; and Nippon Steel Corporation. Lubricating oil. 4,956,109, Cl. 252-48.600.

Tanimoto, Yoshio; and Iketani, Kohichi, to Sumitomo Chemical Company, Limited. Rubber compositions. 4,956,413, Cl. 525-192.000.

Tanner, James A., to Signstrut, Ltd. Tensioning connector for retaining sign membranes. 4,955,928, Cl. 40-603.000.

Tanzawa, Kenji: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,955,985, Cl. 418-257.000.

Target Therapeutics, Inc.: *See*—
Sepetka, Ivan, 4,955,862, Cl. 604-164.000.

Tarver, Matthew A. Applicator and polishing device. 4,955,747, Cl. 401-139.000.

Tasaki, Hisashi; and Endo, Kimikazu, to Omron Tateisi Electronics Co. Method of facsimile transmission after collection of facsimile charge and apparatus therefor. 4,956,721, Cl. 358-402.000.

Tatani, Atsushi: *See*—
Onizuka, Masakazu; and Tatani, Atsushi, 4,955,586, Cl. 261-87.000.

Tatsumi, Akira; Hirata, Toichi; Egashira, Masaki; Tomikawa, Osamu; and Watanabe, Hiroshi, to Hitachi Construction Machinery Co., Ltd. Apparatus for controlling rotational speed of prime mover of construction machine. 4,955,344, Cl. 123-352.000.

Tatsuta, Sumitaka: *See*—
Washizu, Shintaro; Usami, Toshimasa; Tatsuta, Sumitaka; and Yamaguchi, Jun, 4,956,251, Cl. 430-138.000.

Taut, Inc.: *See*—
McFarlane, Richard H., 4,956,143, Cl. 264-334.000.

Tawada, Yoshihisa: *See*—
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.

Tayler, Gerald E.; and Wagner, Robert E., to International Business Machines Corporation. Sequentially processing data in a cached data storage system. 4,956,803, Cl. 364-900.000.

Taylor, Chandler R., Jr.; Cale, Albert D., Jr.; and Stauffer, Harold F., Jr., to A. H. Robins Company, Inc. 3-aryloxy and 3-arylthiooxetidinecarboxamides as anticonvulsants and antiepileptics. 4,956,359, Cl. 514-210.000.

Taylor, Charles S.; and Hampton, Hilary J., to Advanced Cardiovascular Systems, Inc. Guiding member for vascular catheters with a flexible link distal section. 4,955,384, Cl. 128-657.000.

Tazi, Mohammed, to GAF Chemicals Corporation. Process for preparing substantially pure high molecular weight vinyl lactam-quaternized acrylamide copolymers. 4,956,430, Cl. 526-195.000.

TCH Thermo-Consulting-Heidelberg GmbH: *See*—
Mucic, Vinko, 4,955,931, Cl. 62-238.300.

TDK Corporation: *See*—
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.

Tebble, Robert S.: *See*—
Edwards, Geoffrey S.; and Tebble, Robert S., 4,956,550, Cl. 250-227.150.

Techco Corporation: *See*—
Phillips, Edward H., 4,956,590, Cl. 318-432.000.

Technedica, Inc.: *See*—
Carignan, Roger G.; Nahigian, Stanley H.; and Pratt, Clyde R., 4,955,916, Cl. 623-21.000.

Technion Research and Development Foundation Ltd.: *See*—
Zeevi, Yehoshua; and Hilsenrath, Oliver, 4,956,794, Cl. 364-559.000.

Tecnomagnete S.p.A.: *See*—
Cardone, Michele; Grasdini, Angelo; and Zaramella, Bruno, 4,956,625, Cl. 335-290.000.

Tecumseh Products Company: *See*—
Cowen, Russell A., 4,955,797, Cl. 418-15.000.

Teich, Friedhelm: *See*—
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, 4,956,464, Cl. 546-57.000.

Teijin Limited: *See*—
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, 4,955,189, Cl. 57-207.000.

Teitzel, Robin: *See*—
Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, 4,956,650, Cl. 346-108.000.

Tektronix, Inc.: *See*—
Dinteman, Bryan J., 4,956,798, Cl. 364-718.000.

Tel Sagami Limited: *See*—
Ishii, Katsumi; and Sasaki, Yasushi, 4,955,649, Cl. 294-1.100.
Miyagawa, Kazuhisa, 4,955,808, Cl. 432-5.000.
Ohkase, Wataru; and Sato, Seishiro, 4,955,775, Cl. 414-152.000.

Telefonaktiebolaget L M Ericsson: *See*—
Johnson, Sten E.; and Kling, Lars-Orjan, 4,956,770, Cl. 364-200.000.
Vollmer, Per C. M., 4,956,837, Cl. 370-20.000.

Telefunken Electronic GmbH: *See*—
Arndt, Jurgen, 4,956,305, Cl. 437-31.000.
Bohme, Rolf; and Gleim, Gunter, 4,956,615, Cl. 330-288.000.

Teletronics N.V.: *See*—
Callaghan, Francis J.; and Vollmann, William, 4,955,376, Cl. 128-419.0PG.

Teng, Chih-Sieh: *See*—
Liou, Tian-I; and Teng, Chih-Sieh, 4,956,311, Cl. 437-57.000.

Teradata Corporation: *See*—
Neches, Philip M., 4,956,772, Cl. 364-200.000.

Terai, Kiyohisa; and Nishida, Koichi, to Kabushiki Kaisha Toshiba. Electrodes for a gas laser apparatus and method of making the same. 4,956,847, Cl. 372-87.000.

Terai, Kiyohisa; and Nishida, Koichi, to Kabushiki Kaisha Toshiba. Electrodes for gas apparatus and method of making the same. 4,956,848, Cl. 372-87.000.

Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, to Asics Corporation. Production process control system. 4,956,783, Cl. 364-468.000.

Terauchi, Ryugo. Urine-collecting apparatus for wheel-chair. 4,955,922, Cl. 4-480.000.

Terava, Jorma: *See*—
Kivi, Ilkka; Manner, Tapio; Kuvaja, Kari; and Terava, Jorma, 4,955,970, Cl. 285-149.000.

Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kitsutaka, Eiji, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling shifts in an automatic transmission. 4,955,257, Cl. 74-866.000.

Terjesen, John W. Underwear structure. 4,955,088, Cl. 2-403.000.

Terry, Alfred E., III. Height-adjustable roof for a pilot house/helm station. 4,955,313, Cl. 114-361.000.

Terumo Kabushiki Kaisha: *See*—
Ishigaki, Reisaburo, 4,956,187, Cl. 426-46.000.
Sugiyama, Yoshiaki; and Sagae, Kyuta, 4,955,895, Cl. 606-194.000.

Terwilliger, Gerald L., to Bristol Compressors, Inc. Refrigerant gas compressor construction. 4,955,796, Cl. 417-547.000.

Teuscher, Leon A.: *See*—
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.

Tex-Matic ApS: *See*—
Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.

Texas Instruments, Incorporated: *See*—
Balmer, Keith, 4,956,850, Cl. 375-3.000.
Borrello, Sebastian R.; and Roberts, Charles G., 4,956,686, Cl. 357-30.000.
Hashimoto, Masashi, 4,956,820, Cl. 365-222.000.
Hornbeck, Larry J., 4,956,619, Cl. 330-4.300.
Houston, Theodore W., 4,956,814, Cl. 365-154.000.

Houston, Theodore W., 4,956,815, Cl. 365-154.000.
Hunley, Steven A.; and Ovens, Kevin, 4,956,567, Cl. 307-310.000.
Moslehi, Mehrdad M., 4,956,538, Cl. 219-121.600.
Pollack, Gordon P.; Matloubian, Mishel; and Sundaresan, Ravishankar, 4,956,307, Cl. 437-40.000.
Yuan, Han-Tzong; and Tran, Liem Th., 4,956,689, Cl. 357-34.000.

Tezuka, Nobuo: *See*—
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, 4,956,715, Cl. 358-213.190.

Theodoridis, George, to FMC Corporation. Herbicidal triazinediones. 4,956,004, Cl. 71-93.000.

Therex Corp.: *See*—
Enegren, Bradley J.; Melsky, Gerald S.; and Prosl, Frank R., 4,955,861, Cl. 604-141.000.

Thermal Products International: *See*—
Kifer, Edward W.; Wojtyna, V ncent J.; Colton, James P.; and Stickel, Jeffrey T., 4,956,394, Cl. 521-84.100.

Theurer, Josef; Hansmann, Johann; and Worgotter, Herbert, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Tie exchange machine. 4,955,301, Cl. 104-7.200.

Theurer, Josef; and Hansmann, Johann, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Mobile tie gang apparatus. 4,955,302, Cl. 104-7.200.

Thomas, Gareth J.: *See*—
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., 4,956,346, Cl. 514-50.000.

Thomas, Geoffrey N.: *See*—
Arrowsmith, John E.; Cross, Peter E.; Dickinson, Roger P.; and Thomas, Geoffrey N., 4,956,382, Cl. 514-443.000.

Thomas, Ronny D., to PATH. Single-use disposable syringe. 4,955,871, Cl. 604-217.000.

Thomas, Timothy: *See*—
Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, 4,956,650, Cl. 346-108.000.

Thompson, Neil E. S.; and Asperger, Robert G., to Petrolite Corporation. Methods for treating hydrocarbon recovery operations and industrial waters. 4,956,099, Cl. 210-764.000.

Thompson, Peter H.; and Smalling, Richard J., to General Electric Company. Phenylene ether resin based thermoplastic compositions. 4,956,497, Cl. 524-474.000.

Thompson, Steven L.: *See*—
Henke, David R.; and Thompson, Steven L., 4,955,138, Cl. 30-169.000.

Thompson, Trevor J.: *See*—
George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., 4,956,809, Cl. 364-900.000.

Thomsen, Jack W.; Regunathan, Perialwar; and Tadlock, John W., to Everpure, Inc. Filter cartridge with a lugged concentric closure portion. 4,956,086, Cl. 210-232.000.

Thomsen, Svend E.: *See*—
Christensen, Thorkild; Thomsen, Svend E.; and Zenker, Siegfried, 4,955,194, Cl. 60-329.000.

Thomson-CSF: *See*—
Baril, Michel, 4,956,614, Cl. 330-286.000.
Michel, Philippe; Moradpour, Alexandre; and Peuven, Paul, 4,956,508, Cl. 585-26.000.
Pribat, Didier; Perret, Joel; Rouffy, Jean-Claude; and Velasco, Gonzalo, 4,956,073, Cl. 204-426.000.

Thorn Emi plc: *See*—
Samsom, David J.; Willcock, Simon N. M.; and Woolley, Robert A., 4,956,636, Cl. 340-551.000.

Thorne, Andrew J.: *See*—
Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., 4,956,428, Cl. 526-190.000.

Thorngren, John T.: *See*—
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.

Thygeson, David W.: *See*—
Wilts, Charles H.; Burke, Michael T.; and Thygeson, David W., 4,956,825, Cl. 368-9.000.

Tiehuis, Joseph H. M.: *See*—
Janssen, Hendrikus C. J. G.; and Tiehuis, Joseph H. M., 4,955,245, Cl. 74-109.000.

Timmerman, Craig L.: *See*—
Buelt, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.

Tizard, Richard: *See*—
Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.

TMC Corporation: *See*—
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.

Toda, Kozo, to Canon Kabushiki Kaisha. Recording apparatus with sheet size selection. 4,956,723, Cl. 358-449.000.

Toda, Masaaki; Obuchida, Shuichi; and Ohno, Hiroyuki, to Oso Pharmaceutical Co., Ltd. Prolinal compounds useful in treating amnesia. 4,956,380, Cl. 514-422.000.

Todd, E. T., Jr.; and Shivar, John R. Covertible chassis for a semi-trailer. 4,955,629, Cl. 280-407.000.

Todd, Paul H., Jr., to Kalamazoo Holdings, Inc. Hop flavors wherein deleterious odor-forming impurities have been removed. 4,956,195, Cl. 426-600.000.

Todd, Raymond A., Jr.: *See*—
Bailey, Thomas F.; and Todd, Raymond A., Jr., 4,955,949, Cl. 137-71.000.

Todd, William J.: *See*—
Hart, Lewis T.; Luther, Donald G.; and Todd, William J., 4,956,278, Cl. 435-30.000.

Toeda, Hiroshi: *See*—
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.

Tognella, Sergio: *See*—
Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, 4,956,369, Cl. 514-274.000.

Tohmiya, Masato, to Fuji Jukogyo Kabushiki Kaisha. Idle revolution number control apparatus for carbureter. 4,955,342, Cl. 123-339.000.

Tohoku Electric Manufacturing Co., Ltd.: *See*—
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.

Toida, Akikazu: *See*—
Iwata, Satoshi; Toida, Akikazu; and Takahashi, Fumio, 4,955,736, Cl. 400-120.000.

Tokiwa, Shizuro: *See*—
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.

Tokuda, Teruhiko; Ishihara, Koji; Maruyama, Masahiko; and Wada, Manabu, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Fuel supply system. 4,955,409, Cl. 137-561.00A.

Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device and fabricating method thereof. 4,956,310, Cl. 437-52.000.

Tokui, Yasuyuki: *See*—
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.

Tokyo Electron Limited: *See*—
Narushima, Masaki; and Takao, Itaru, 4,955,590, Cl. 269-21.000.

Tokyo Gas Kabushiki Kaisha: *See*—
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.

Tokyo Kikai Seisakusho Ltd.: *See*—
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.

Tokyo Soil Research Co., Ltd.: *See*—
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, 4,955,237, Cl. 73-784.000.

Toledo Automated Concepts, Inc.: *See*—
Delventhal, Kent A.; and Grosjean, Kenith E., 4,955,763, Cl. 408-40.000.

Toledo Scale Corporation: *See*—
Mills, Nigel G.; Heckendorn, Larry C.; Long, Curtis W.; and Smigel, Richard T., 4,955,441, Cl. 177-255.000.

Tolentino, Daniela: *See*—
Cassani, Giorgio; Borgonovi, Girgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.

Toma, Ken: *See*—
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, 4,955,525, Cl. 228-183.000.

Tomar Electronics, Inc.: *See*—
Sikora, Scott T., 4,956,584, Cl. 315-241.00R.

Tomikawa, Osamu: *See*—
Tatsumi, Akira; Hirata, Toichi; Egashira, Masaki; Tomikawa, Osamu; and Watanabe, Hiroshi, 4,955,344, Cl. 123-352.000.

Tominaga, Shinji: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.

Tomino, Tadashi: *See*—
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.

Tomioka, Katsumi: *See*—
Ootsuki, Noboru; Tomioka, Katsumi; and Conishi, Toshihiko, 4,955,122, Cl. 29-237.000.

Tomisawa, Norio, to Yamaha Corporation. Jitter control circuit having signal delay device using CMOS supply voltage control. 4,956,720, Cl. 358-324.000.

Tomita, Hirofumi: *See*—
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nozaka, Nobuyuki, 4,956,375, Cl. 514-361.000.

Tomosada, Kiyoshi: *See*—
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.

Tompkins, Thomas M.; and Presty, Dominic F., to United States Surgical Corporation. Locking mechanism for a surgical fastening apparatus. 4,955,959, Cl. 227-178.000.

Ton, Robert B.: *See*—
Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., 4,955,305, Cl. 112-121.110.

Tone, Frederick F.: *See*—
Pierson, Charles W.; and Tone, Frederick F., 4,955,555, Cl. 242-74.000.

Tone, Junsuke: *See—*
Cullen, Walter P.; Hauske, James R.; Maeda, Hiroshi; and Tone, Junsuke, 4,956,283, Cl. 435-76.000.

Tonelli, Claudio: *See—*
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.

Tong, Shen-Nan; Tsai, Shih-Jung; and Lii, Jyi-Shang. High performance modified polyurethanes. 4,956,439, Cl. 528-53.000.

Toppan Printing Co., Ltd.: *See—*
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Suwa, Takeshi, 4,956,703, Cl. 358-76.000.

Toray Silicone Company, Ltd.: *See—*
Kaiya, Nobuo; and Sasaki, Shosaku, 4,956,206, Cl. 427-387.000.

Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, to Hitachi, Ltd. ATM switching system. 4,956,839, Cl. 370-60.000.

Torimoto, Yoshiaki: *See—*
Shirasaki, Yoshitsugu; and Torimoto, Yoshiaki, 4,956,259, Cl. 430-137.000.

Torok, Vilmos; and Loreth, Andrezej, to Astra-Vent AB. Arrangement for generating an electric corona discharge in air. 4,955,991, Cl. 55-120.000.

Torti, Anthony, to Kenney Manufacturing Company. Continuous cord roll up blind. 4,955,421, Cl. 160-243.000.

Toshimitsu, Hiroyuki: *See—*
Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotsu; and Hirayama, Masayoshi, 4,955,213, Cl. 68-12.00R.

Toth, John A., to Key Manufacturing Group, Inc. Decorative capped wheel nut and method of making same. 4,955,773, Cl. 411-429.000.

Toto Ltd.: *See—*
Tsutsui, Osamu; Haraga, Hisato; Arita, Kinya; Makita, Atsuo; Takeuchi, Hirofumi; and Tsukada, Ryoichi, 4,955,535, Cl. 236-12.120.

Totoku Electric Co., Ltd.: *See—*
Sakai, Yoshio; and Yamada, Takeshi, 4,955,253, Cl. 74-553.000.

Touzani, William N. Collapsible expansible plastic hollow articles in a latchable configuration. 4,955,493, Cl. 215-100.00R.

Tovar, Domingo. Water purification device. 4,956,083, Cl. 210-222.000.

Toyo Boseki Kabushiki Kaisha: *See—*
Isaka, Tsutomu; and Ohta, Saburo, 4,956,209, Cl. 428-35.200.
Mitamura, Hideyuki; and Arimatsu, Yoshikazu, 4,956,431, Cl. 526-257.000.

Toyo Garasu Kabushiki Kaisha: *See—*
Fujita, Toshiki; Kimura, Hirokazu; and Yamato, Yoshihiro, 4,955,227, Cl. 73-104.000.

Toyo Ink Mfg. Co., Ltd.: *See—*
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.

Toyo Kohan Co., Ltd.: *See—*
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.

Toyoda, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Fuel injector assembly for fuel-injected engine. 4,955,347, Cl. 123-472.000.

Toyofuku, Kunitaka: *See—*
Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, 4,956,332, Cl. 503-209.000.

Toyohara, Makoto: *See—*
Suzuki, Tomonori; and Toyohara, Makoto, 4,955,836, Cl. 440-77.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Haraguchi, Tetsunori, 4,955,635, Cl. 280-675.000.
Ise, Kiyotaka; and Fujita, Kozo, 4,955,448, Cl. 180-197.000.
Kashihara, Yuji; Iwatsuki, Kunihiro; and Taga, Yutaka, 4,955,256, Cl. 74-866.000.
Morisawa, Kunio, 4,955,852, Cl. 475-146.000.
Sasaki, Shizuo; and Tamaki, Yoshiyuki, 4,955,339, Cl. 123-295.000.
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.

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Trak International, Inc.: *See—*
Simonz, John C., 4,955,452, Cl. 180-271.000.

Tran, Liem Th.: *See—*
Yuan, Han-Tzong; and Tran, Liem Th., 4,956,689, Cl. 357-34.000.

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Almes, Horst-Dieter; and Grutza, Bernd, 4,955,466, Cl. 198-831.000.

Transpirator Technologies, Inc.: *See—*
Blackmer, Richard H.; and Hedman, Jonathan W., 4,955,372, Cl. 128-203.160.

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Zamba, Gene; and Glazier, Stephen C., 4,955,371, Cl. 128-200.180.

Trapp, Horst: *See—*
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.

Tri Tool Inc.: *See—*
VanderPol, Jerald; Marshall, Mark A.; and Wheeler, Warren V., 4,955,263, Cl. 82-118.000.

Trident Laboratories, Inc.: *See—*
Adell, Loren S., 4,955,393, Cl. 128-859.000.

Trieselt, Wolfgang: *See—*
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Holuigue, Claude; Panholzer, Heinrich; Maier, Karl-Wilhelm; and Trimmel, Wolfgang, 4,956,849, Cl. 373-120.000.

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Bronstein, Irena Y.; and Edwards, Brooks, 4,956,477, Cl. 549-221.000.

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Trulaske, Robert J., Sr., 4,955,486, Cl. 211-59.200.

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Jagst, Peter, 4,955,111, Cl. 19-102.000.

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Goss, Kenneth C, 4,956,863, Cl. 380-30.000.
Kaminskas, Rimvykas A., 4,955,559, Cl. 244-52.000.

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Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., 4,956,306, Cl. 437-34.000.

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Suzuki, Yuji; Urano, Satoshi; Umemoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.

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Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.

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Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, 4,956,333, Cl. 503-209.000.

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Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, 4,956,392, Cl. 518-712.000.

Tsujii, Hiraaki: *See—*
Ohnaka, Kiyoshi; Tsujii, Hiraaki; Sasai, Yoichi; and Shibata, Jun, 4,956,682, Cl. 357-16.000.

Tsujimoto, Kazunori: *See—*
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.

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Tsukaya, Takashi: *See—*
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Tsunai, Yuko: *See—*
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Tsunoda, Teruo: *See—*
Kawashima, Masaei; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syczo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, to Tanaka Kikinzoku Kogyo K.K. Process for producing metal supported catalyst having high surface area. 4,956,331, Cl. 502-339.000.

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Weems, Craig C., 4,955,645, Cl. 285-355.000.

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Kolb, Robert E.; Tuckner, Paul F.; and Guenthner, Richard A., 4,956,419, Cl. 525-342.000.

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George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., 4,956,809, Cl. 364-900.000.

Turbak, Albin F.: *See*—
Tymon, Thomas M.; and Turbak, Albin F., 4,956,121, Cl. 252-378.00R.

Turcsanyi, Peter: *See*—
Kreidl, Janos; Turcsanyi, Peter; Stefko, Bela; Meszaros nee Brill, Judit; and Bogach, Erika, 4,956,007, Cl. 71-103.000.

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Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., 4,955,305, Cl. 112-121.110.

Twine, David C.: *See*—
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.

Ty Tan, Michael R.: *See*—
Su, Chung-Yi; Ty Tan, Michael R.; and Anklam, William J., 4,956,568, Cl. 307-352.000.

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Cossement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, 4,956,367, Cl. 514-236.200.
Wulfert, Ernst; Gobert, Jean; and Cossement, Eric, 4,956,363, Cl. 514-232.200.

U. Christian Seefluth: *See*—
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Uarco Inc.: *See*—
Haase, Roger L.; and Fitzgibbons, Gary W., 4,955,526, Cl. 229-69.000.

UBE Industries, Ltd.: *See*—
Akimoto, Haruo; and Takeya, Kunio, 4,955,426, Cl. 164-314.000.

Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, to Casco Kabushiki Kaisha. Printer with disengageable ribbon feed. 4,955,738, Cl. 400-229.000.

Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, to Shin-Etsu Handotai Co., Ltd.; and Shin-Etsu Quartz Products Co., Ltd. Manufacture of a quartz glass vessel for the growth of single crystal semiconductor. 4,956,208, Cl. 428-34.600.

Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, to Olympus Optical Co., Ltd. Ultrasonic therapeutical apparatus. 4,955,366, Cl. 128-24.00A.

Uda, Shoichi: *See*—
Kimura, Hideki; and Uda, Shoichi, 4,955,179, Cl. 53-212.000.

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Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.

Ueda, Aki: *See*—
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Ueda, Eiichi: *See*—
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.

Ueda, Hideaki, to Minolta Camera Kabushiki Kaisha. Photosensitive member. 4,956,255, Cl. 430-59.000.

Ueda, Hiroshi: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.

Ueda, Kanji; Haruna, Kazuo; and Inoue, Masahiro, to Sumitomo Seika Chemicals Co., Ltd. Process for separating gas. 4,955,998, Cl. 55-16.000.

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Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, to Fuji Photo Film Co., Ltd. Method for forming a direct positive color image. 4,956,267, Cl. 430-372.000.

Ueda, Tsunehisa: *See*—
Miki, Yoshiaki; and Ueda, Tsunehisa, 4,956,183, Cl. 424-630.000.

Ueha, Sadayuki: *See*—
Hiroshige, Ken; and Ueha, Sadayuki, 4,955,598, Cl. 271-267.000.

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Ueng, Ming-Shean. All-occasion rope. 4,955,601, Cl. 272-75.000.

Ueno, Hiroshi, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Compact switch device. 4,956,529, Cl. 200-524.000.

Ueoka, Masatoshi; Matsumoto, Syoichi; Yoshida, Hiroshi; and Baba, Masao, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Process for producing methacrylic ester. 4,956,493, Cl. 560-208.000.

Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, to Matsushita Electric Industrial Co., Ltd. Laser processing method. 4,956,539, Cl. 219-121.800.

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Kojima, Takao; and Ujita, Yasuhiro, 4,956,072, Cl. 204-424.000.

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Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.

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Kniest, James N.; and Campbell, Dean D., 4,955,225, Cl. 73-1.00J.

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Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.

Umezawa, Hamao, deceased: *See*—
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.

Umezawa, Mieko, Kazuo Umezawa, Yoji Umezawa, administrators: *See*—
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UMR-Lukton Inc.: *See*—
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UNC Reclamation: *See*—
Magdics, Alex; and Stain, Donald B., 4,956,154, Cl. 423-54.000.

Underdown, Ronald W., to Ronald W. Underdown. Liner for fireplace grate. 4,955,362, Cl. 126-540.000.

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Kinman, Frank R., 4,955,439, Cl. 175-45.000.

Underhill, Alan E.: *See*—
Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., 4,956,441, Cl. 528-171.000.

Ungarelli, Raffaele: *See*—
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Aldcroft, Derek; Newton, John; Quinn, James P.; and Stanier, Peter W., 4,956,167, Cl. 423-339.000.
Macrae, Alasdair R., 4,956,286, Cl. 435-134.000.
Staal, Leendert H.; Vis, Jan C.; and Groeneweg, Jan W., 4,956,126, Cl. 260-428.000.

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Ardell, George G.; Geck, Reginald W.; Jenkins, John M., III; and Sheard, William G., 4,956,426, Cl. 526-60.000.
Jenkins, John M., III; McCullough, James D., Jr.; and Sawin, Steven P., 4,956,427, Cl. 526-62.000.

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Covey, Rupert A.; Forbes, Patricia J.; Bell, Allyn R.; and Blem, Allen R., 4,956,469, Cl. 548-251.000.
Watts, Raymond F.; Loveless, Frederick C.; and Nadenberg, Walter, 4,956,122, Cl. 252-565.000.
Wheeler, Edward L.; and Franko, Robert J., 4,956,405, Cl. 524-100.000.

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Baumhofer, Johannes J., 4,955,418, Cl. 152-539.000.

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Leahy, Ronald S.; Smith, Patrick J.; and Bullock, Scott R., 4,956,644, Cl. 342-351.000.

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Agriculture: *See*—
Dowd, Patrick F.; and Cole, Richard J., 4,956,343, Cl. 514-11.000.
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Frick, Vincent, 4,956,201, Cl. 427-181.000.
Harris, Meckie T.; Larkin, John J.; Armington, Alton F.; and Kennedy, John K., 4,956,047, Cl. 156-623.00Q.
Rogowski, Gregory S.; Davidson, Thomas F.; and Ludlow, Timothy, 4,956,397, Cl. 523-138.000.
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Dukas, Stephen J., Jr., 4,955,581, Cl. 251-214.000.
Fisher, John J., 4,955,250, Cl. 74-479.000.
Hemenway, Lloyd F., Jr., 4,955,942, Cl. 122-4.00D.
Moeller, Charles P., 4,956,620, Cl. 333-21.00R.

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Haynes, Robert L., 4,956,612, Cl. 328-5.000.
Petrousky, James A.; Beckofen, Joseph E.; and Butz, Donald J., 4,955,939, Cl. 102-476.000.
Wagaman, Kerry L., 4,956,168, Cl. 423-386.000.

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Bahlmann, Johannes P. M., 4,956,565, Cl. 307-254.000.
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Braunisch, Eckart; and Onnegren, Jan, 4,956,531, Cl. 219-10.55B.
Brouwer, Geert, 4,956,855, Cl. 378-45.000.
Dona, Marinus J. J.; and Swinkels, Johannes M. M., 4,955,937, Cl. 82-1.110.
Harding, Geoffrey, 4,956,856, Cl. 378-88.000.
L'Hermite, Pierre, 4,956,576, Cl. 313-533.000.
Meijer, Egbert W.; Van Vroonhoven, Franciscus C. B. M.; and Nijhuis, Jozef H. H., 4,956,239, Cl. 428-411.100.
Van Laarhoven, Josephus M. F. G., 4,956,312, Cl. 437-180.000.

United States Surgical Corporation: *See*—
Tompkins, Thomas M.; and Presty, Dominic F., 4,955,959, Cl. 227-178.000.

United Technologies Automotive, Inc.: *See*—
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Vivaldi, Alexander M., 4,956,037, Cl. 156-155.000.

United Wire & Cable (Canada) Inc.: *See*—
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Unitika Limited: *See*—
Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, 4,956,446, Cl. 528-272.000.

Universal Data Systems, Inc.: *See*—
Hodge, Dean Y., 4,956,852, Cl. 375-8.000.

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University of California, The Regents of the: *See*—
Pehl, Richard H.; Madden, Norman W.; and Malone, Donald F., 4,955,204, Cl. 62-51.100.

University of Florida: *See*—
Corey, George A., 4,955,866, Cl. 604-192.000.

University of Houston - University Park: *See*—
Salama, Kamel; and Selvamanickam, Venkatakrishnan, 4,956,336, Cl. 505-1.000.

University of Maryland, The: *See*—
Snyder, David B.; Marquardt, Warren W.; Gorham, Sammy L.; and Lana, Dolores P., 4,956,452, Cl. 530-387.000.

University of Michigan, The: *See*—
Merlin, Roberto; and Clarke, Roy, 4,955,692, Cl. 350-166.000.
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University of OK, The Board of Regents of the: *See*—
Rohrer, Michael D.; and Bulard, Ronald A., 4,956,155, Cl. 422-297.000.

University of South Florida: *See*—
Grasso, Robert J., 4,955,378, Cl. 128-421.000.

University of Southern California: *See*—
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Unoki, Hiromi: *See*—
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Volles, Warren K., 4,956,521, Cl. 585-826.000.
Zinnen, Hermann A., 4,956,522, Cl. 585-828.000.

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Uphues, Guenter: *See*—
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Urabe, Hiroshi: *See*—
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.

Urano, Satoshi: *See*—
Suzuki, Yuji; Urano, Satoshi; Umesnoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.

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Uretsky, Laura S.: *See*—
Piran, Uri; Stastny, Milos; and Uretsky, Laura S., 4,956,299, Cl. 436-18.000.

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Fuller, Mark W.; and Robinson, Alan S., 4,955,540, Cl. 239-20.000.

Wetor, Clyde R., to Outboard Marine Corporation. Control mechanism for hydrostatic transmission. 4,955,249, Cl. 74-473.00R.

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Cousins, Walter K., 4,955,102, Cl. 15-182.000.

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Donaghy, David J., 4,955,675, Cl. 312-214.000.
Weaver, Douglas E.; and Mawby, Harold S., 4,955,676, Cl. 312-214.000.

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Glick, Dennis; Vale, Nicholas; McDade, Michael; and Vogel, Richard, 4,955,405, Cl. 137-234.600.

White, Woodrow W., to GenCorp. Inc. Process for preparing unsaturated nitrogen containing acids. 4,956,495, Cl. 562-567.000.

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Heckaman, Douglas E.; Baker, John E.; and Whybrew, Walter M., 4,956,621, Cl. 333-104.000.

Wicker, James H., to Specialty Manufacturing Co., Inc. Safety unit actuating device. 4,956,630, Cl. 340-433.000.

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Graves, Lee K., 4,955,658, Cl. 296-75.000.

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Hofmeister, Helmut; Annen, Klaus; Laur -it, Henry; and Wiechert, Rudolf, 4,956,482, Cl. 552-594.000.

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Kranz, Joachim; and Wiesenberger, Alois, 4,956,018, Cl. 106-401.000.

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Josef, Moshe; and Wiesenfeld, David, 4,955,219, Cl. 72-187.000.

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Wilk, Robert J., to G & W Electric Company. Electrical insulating bushing assembly, kit for providing same, and method of installing same. 4,956,525, Cl. 174-152.00R.

Wilker, John B., Sr.: *See*—
Schulte, Stephen R.; Wissel, Stephen C.; and Wilker, John B., Sr., 4,956,592, Cl. 318-560.000.

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Baker, Geoffrey; Pearce, Roger; and Williamson, Paul L., 4,956,554, Cl. 250-338.300.

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Willy, Gerd: *See*—
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Lok, Brent M. T.; Marcus, Bonita K.; Messina, Celeste A.; Wilson, Stephen T.; and Flanigen, Edith M., 4,956,165, Cl. 423-306.000.

Wilts, Charles H.; Burke, Michael T.; and Thygeson, David W. Device for monitoring the rate of use of an electrical appliance. 4,956,825, Cl. 368-9.000.

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Harris, Rodney G.; Seal, John; Johnston, Robert L.; and Windham, Marvin R., 4,955,358, Cl. 126-25.00R.

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Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteith, John R.; Seale, Mark A.; and Wisecup, David R., 4,956,045, Cl. 156-384.000.

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Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., 4,956,573, Cl. 313-15.000.

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Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.

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Meess, Daniel C.; Jones, Bobby J.; Mello, Raymond M.; Weiss, Thomas G., Jr.; and Wright, James B., 4,955,983, Cl. 405-128.000.

Wright, Ronald R.: *See*—
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Yamamura, Akira, to Nippon Ferrofluidics Corporation. Bearing equipment for vacuum devices. 4,955,731, Cl. 384-133.000.

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Yang, Tai-Her. Position and angle of polar coordinate adjustable vice. 4,955,593, Cl. 269-71.000.

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sure water absorption of lightweight aggregate by aqueous dispersion therein of anionic polymers. 4,956,403, Cl. 524-5.000.

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Kuwabara, Yohei; Asaoka, Teruo; Yoshioka, Shogo; and Sugiyama, Haruki, 4,956,060, Cl. 204-129.200.

Yoshioka, Yasuhiko: *See*—
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakaue, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.

Yoshitake, Noriaki: *See*—
Saeki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, 4,956,027, Cl. 148-257.000.

Young, Lydia J.: *See*—
Dean, Robert L.; Young, Lydia J.; and Veneklasen, Lee H., 4,956,024, Cl. 134-37.000.

Younts, Donna; and Yeung, Eileen, to Continental American Corporation. Apparatus for injecting confetti into a balloon. 4,955,412, Cl. 141-114.000.

Youtz, Stephen E.: *See*—
Grunden, Michael T.; Youtz, Stephen E.; and Mierzwinski, Eugene P., 4,955,806, Cl. 431-24.000.

Yuan, Han-Tzong; and Tran, Liem Th., to Texas Instruments Incorporated. High speed gallium arsenide transistor and method. 4,956,689, Cl. 357-34.000.

Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, to Fuji Photo Film Co., Ltd. Dry analytical element and process for producing the same. 4,956,146, Cl. 422-56.000.

Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, to Asics Corporation; and Otsuka Chemical Co., Ltd. Rubber composition and golf ball comprising it. 4,955,966, Cl. 273-218.000.

Yukino, Toshinori: *See*—
Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.

Yun, Kyung S.; and Cho, Byung W., to Korea Institute of Science and Technology. Multi-rotating disk electrode and solid polymer electrolyte electrode type electrolytic bath. 4,956,067, Cl. 204-212.000.

Yun-Shaug, Wang. Automatic car lamps lighting controller. 4,956,580, Cl. 315-83.000.

Yuzo, Higaki: *See*—
Tanikawa, Keiichi; and Yuzo, Higaki, 4,956,109, Cl. 252-48.600.

Zaccone, Samuel G. Dispenser for string for bird nests. 4,955,320, Cl. 119-57.800.

Zach, Ronald: *See*—
Schmidthaler, Johann J.; and Zach, Ronald, 4,955,706, Cl. 351-41.000.

Zaharris, Daniel R.: *See*—
Sarraf, Raymond E.; and Zaharris, Daniel R., 4,956,831, Cl. 369-32.000.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.

Zaidan Hojin Handotai Kenkyu Sinkokai: *See*—
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.

Zaitsev, Alexandr A.: *See*—
Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A., 4,956,056, Cl. 204-129.430.

Zamba, Gene; and Glazier, Stephen C., to Transtech Scientific, Inc. Disposable inhalation activated, aerosol device for pulmonary medicine. 4,955,371, Cl. 128-200.180.

Zamzow, Charled E.: *See*—
Carver, Larry L.; Zamzow, Charled E.; and Mladenoff, Donald D., 4,956,764, Cl. 364-167.010.

Zaoralek, Heinz-Michael, to Schwabische Huttenwerke GmbH. Heating or cooling roller. 4,955,433, Cl. 165-89.000.

Zappa, Donald E.; and Cascone, James J., to Westinghouse Electric Corp. Closed loop system and method for cleaning articles with a volatile cleaning solvent. 4,955,403, Cl. 134-109.000.

Zaramella, Bruno: *See*—
Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno, 4,956,625, Cl. 335-290.000.

Zarnowski, Alfred J.; and Cohen, Robert C., to Osteonics Corp. Acetabular cup component cement spacer system. 4,955,325, Cl. 623-22.000.

Zebco Corporation: *See*—
Henderson, William A.; and Nelson, Isaac H., 4,955,834, Cl. 440-63.000.

Zeevi, Yehoshua; and Hilsenrath, Oliver, to Technion Research and Development Foundation Ltd. Single camera three dimensional head position sensing system. 4,956,794, Cl. 364-559.000.

Zenker, Siegfried: *See*—
Christensen, Thorkild; Thomsen, Svend E.; and Zenker, Siegfried, 4,955,194, Cl. 60-329.000.

Zerpner, Dieter; and Haag, Horst G., to Huels Aktiengesellschaft. Coupling agents for vulcanizable mixtures of unsaturated rubbers and silicon-containing fillers. 4,956,498, Cl. 524-492.000.

Zielski, Alfred G.; and Fong, Ronald A., to Clorox Company, The. Phenoxyacetate peracid precursors and perhydrolysis systems therewith. 4,956,117, Cl. 252-186.380.

Ziemianek, Janusz B., to Foster Wheeler USA Corporation. Fired heater. 4,955,323, Cl. 122-4.00D.

Zilber, Serge, to C. R. Bard, Inc. High-friction prostatic stent. 4,955,859, Cl. 604-8.000.

Zimmer, Inc.: *See*—
Meyers, John E., 4,955,885, Cl. 606-53.000.

Zimmer, Johannes; Gutler, Franz; and Mortl, Engelbert, to Zimmer, Johannes. Roller doctor or squeegee apparatus for applying fluid material to a substrate. 4,955,298, Cl. 101-120.000.

Zimmerman, John M.: *See*—
Shama, Sami A.; Poklacki, Erwin S.; and Zimmerman, John M., 4,956,198, Cl. 427-54.100.

Zimmerman, Sheldon B.: *See*—
Currie, Sara A.; Miller, Thomas W.; Dulaney, Eugene L.; Springer, James P.; Valiant, Mary E.; Zimmerman, Sheldon B.; and Del Val, Sagrario M., 4,956,294, Cl. 435-252.100.

Zimowski, Melvin R.: *See*—
Shibamiya, Akira; and Zimowski, Melvin R., 4,956,774, Cl. 364-200.000.

Zinnen, Hermann A., to UOP. Zeolitic para-ethyltoluene separation with tetralin heavy desorbent. 4,956,522, Cl. 585-828.000.

Zinpro Corporation: *See*—
Anderson, Michael D., 4,956,188, Cl. 426-74.000.

Zirm, Mathias, to Storz Instrument Company. Optical surgical instrument. 4,955,887, Cl. 606-107.000.

Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A. Method of abrasive electroerosion grinding. 4,956,056, Cl. 204-129.430.

Zuccaro, Dante C.: *See*—
Caracciolo, Anthony, Jr.; Austin, Wayne R.; Zuccaro, Dante C.; and Pomrehn, Leonard P., 4,955,655, Cl. 294-93.000.

Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, to Molecular Devices Corporation. Migratory detection immunoassay. 4,956,275, Cl. 435-7.000.

Zumbach Electronic AG: *See*—
Kaser, Beda, 4,955,694, Cl. 350-320.000.

Zundel, Jean-Luc: *See*—
Goni, Sylvie; Piot, Odile; and Zundel, Jean-Luc, 4,956,362, Cl. 514-217.000.

Zurek, Patrick M.; Greenberg, Julie E.; and Peterson, Patrick M., to Massachusetts Institute of Technology. Adaptive beamforming for noise reduction. 4,956,867, Cl. 381-94.100.

Zyer, Benjamin: *See*—
Lang, Gary D.; and Zyer, Benjamin, 4,955,206, Cl. 62-186.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Carlson, Randolph S., to Irvine Sensors Corporation. Multiplexer circuitry for high density analog signals. Re. 33,331, Cl. 307-243.000.

Dickson, James: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.

Director, Dennis. Write protect control circuit for computer hard disc systems. Re. 33,328, Cl. 364-200.000.

Dunlap, David L.: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.

Ebata, Hitoshi; and Matunaga, Shigetugu, to Toshiba Kikai Kabushiki Kaisha. Semiconductor vapor phase growing apparatus. Re. 33,326, Cl. 118-697.000.

Fuji Xerox Co., Ltd.: *See*—
Ishii, Shoichi, Re. 33,329, Cl. 271-245.000.

Furuya, Tsuneo; and Hori, Katsuya, to Sony Corporation. Apparatus for correcting errors. Re. 33,332, Cl. 371-37.400.

Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., to Ribbon Technology Corporation. Melt overflow system for producing filamentary and film products directly from molten materials. Re. 33,327, Cl. 164-463.000.

Hand, Larry E.: *See*—
Taylor, Wilson E., Jr.; and Hand, Larry E., Re. 33,333, Cl. 330-10.000.

Handshey, Mark E.: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.

Hida, Yukio: *See*—
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.

Hori, Katsuya: *See*—
Furuya, Tsuneo; and Hori, Katsuya, Re. 33,332, Cl. 371-37.400.

Irvine Sensors Corporation: *See*—
Carlson, Randolph S., Re. 33,331, Cl. 307-243.000.

Ishii, Shoichi, to Fuji Xerox Co., Ltd. Automatic feeding device for copying machines. Re. 33,329, Cl. 271-245.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.

Maruyama, Tokuji: *See*—
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.

Matunaga, Shigetugu: *See*—
Ebata, Hitoshi; and Matunaga, Shigetugu, Re. 33,326, Cl. 118-697.000.

Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, to Kabushiki Kaisha Kobe Seiko Sho. Output control of short circuit welding power source. Re. 33,330, Cl. 219-137.0PS.

Peavey Electronics Corporation: *See*—
Taylor, Wilson E., Jr.; and Hand, Larry E., Re. 33,333, Cl. 330-10.000.

Ribbon Technology Corporation: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.

Saito, Takashi: *See*—
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.

Sato, Masaharu: *See*—
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.

Sony Corporation: *See*—
Furuya, Tsuneo; and Hori, Katsuya, Re. 33,332, Cl. 371-37.400.

Taylor, Wilson E., Jr.; and Hand, Larry E., to Peavey Electronics Corporation. Digital audio amplifier having a high power output level and low distortion. Re. 33,333, Cl. 330-10.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Ebata, Hitoshi; and Matunaga, Shigetugu, Re. 33,326, Cl. 118-697.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Becker, Phillip D.: *See*—
Peterson, Francis C.; and Becker, Phillip D., B1 4,729,706, Cl. 411-175.000.

Buell Industries, Inc.: *See*—
Peterson, Francis C.; and Becker, Phillip D., B1 4,729,706, Cl. 411-175.000.

Han Il E'wha: *See*—
Lee, Chang Y., B1 4,866,110, Cl. 524-11.000.

Lee, Chang Y., to Han Il E'wha. Thermoplastic compositions resin molded product for vehicle lining and method for manufacturing the same. B1 4,866,110, 9-11-90, Cl. 524-11.000.

Matta, Grant B., to Penetone Corp. D-limonene based aqueous cleaning compositions. B1 4,511,488, 9-11-90, Cl. 252-162.000.

Penetone Corp.: *See*—
Matta, Grant B., B1 4,511,488, Cl. 252-162.000.

Peterson, Francis C.; and Becker, Phillip D., to Buell Industries, Inc. Fastener clip. B1 4,729,706, 9-11-90, Cl. 411-175.000.

LIST OF DESIGN PATENTEES

Agrippino, Galoppo. Combination key ring and pen. 310,449, 9-11-90, Cl. D3-62.000.

Alex Synn AG: *See*—
Hopfer, Hans, 310,452, Cl. D6-361.000.

Ali, S. Altaf; and Harmon, Jack W., to San Shoe Trading Corp. Weighted shoe upper. 310,441, 9-11-90, Cl. D2-314.000.

Alie, Enrique: *See*—
Ryan, James M.; Alie, Enrique; and Stowers, David C., 310,534, Cl. D16-214.000.

American Greetings Corporation: *See*—
Hodgson, Dale; and Stram, John, 310,456, Cl. D6-491.000.

American Standard Inc.: *See*—
Stairs, Henry M., Jr., 310,560, Cl. D23-313.000.

Andoe Inc.: *See*—
Dobelle, Howard, 310,586, Cl. D30-109.000.

Ateliers de Moulage Specialise Packaging: *See*—
Geiger, Reinold, 310,480, Cl. D9-300.000.

Avittan, Naftali. Sale sign. 310,545, 9-11-90, Cl. D20-10.000.

Barrett, William H.; Gregory, Joseph A.; Mohr, Lisa M.; and Schaum, David L., to International Business Machines Corporation. Screen stand. 310,535, 9-11-90, Cl. D16-241.000.

Bartsch, Daniel; and Bartsch, Jane A. Retractable double blade knife. 310,474, 9-11-90, Cl. D8-99.000.

Bartsch, Jane A.: *See*—
Bartsch, Daniel; and Bartsch, Jane A., 310,474, Cl. D8-99.000.

Beasley, Hollis R. Memorial flag display case. 310,454, 9-11-90, Cl. D6-470.000.

Beckman Instruments, Inc.: *See*—
Lang, Karen, 310,478, Cl. D8-373.000.

Bedard, Paul R., to Fellowes Manufacturing Inc. Bracket for suspending a filter in front of a video monitor screen. 310,520, 9-11-90, Cl. D14-114.000.

Bedocs, Lou; and Eksteen, Michael C., to Thorn EMI plc. Adapter for a track light. 310,511, 9-11-90, Cl. D13-133.000.

Besaw, Bradley M. Pill crusher. 310,564, 9-11-90, Cl. D24-23.000.

Bezos, Angel P., to Pulse Electronics, Inc. Default controller for railway vehicles. 310,510, 9-11-90, Cl. D13-128.000.

Bianco, James S. Shop floor data terminal or the like. 310,515, 9-11-90, Cl. D14-100.000.

Bonasia, Donald. Chop stick knife. 310,465, 9-11-90, Cl. D7-644.000.

Broden, Bengt-Inge. Cannula for withdrawing a test sample from a test tube. 310,569, 9-11-90, Cl. D24-51.000.

Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, to Cigarette Racing Team, Inc. Boat hatch. 310,508, 9-11-90, Cl. D12-317.000.

Brown, Toran S., to McGregor Company, The. Electronic address book. 310,543, 9-11-90, Cl. D19-76.000.

Brys, Lyle W. Tractor trailer air chute. 310,501, 9-11-90, Cl. D12-97.000.

Cadet, Emmanuel. Lighted telescopic mirror. 310,584, 9-11-90, Cl. D28-64.100.

Calayan, Carolina: *See*—
Puglisi, Salvatore A.; and Calayan, Carolina, 310,440, Cl. D1-127.000.

Callinan, Christopher J., to Regent Sheffield, Ltd. Package. 310,488, 9-11-90, Cl. D9-418.000.

Camens, Murray I. C., to U.S. Philips Corporation. Combined radio and cassette recorder. 310,525, 9-11-90, Cl. D14-162.000.

Campbell, Larry D. Double back swing seat. 310,552, 9-11-90, Cl. D21-246.000.

Camus La Grande Marque: *See*—
Daucourt, Michel, 310,484, Cl. D9-384.000.

Canon Kabushiki Kaisha: *See*—
Komada, Takeshi; and Okayama, Yutaka, 310,539, Cl. D18-40.000.

Casablanca Fan Company, Inc.: *See*—
Janicz, Thomas H., 310,561, Cl. D23-377.000.

Castelli, Renato P.; Van Hoye, Willibald; Miles, Richard; and Green, Stephen T., to Samsonite Corporation. Luggage case. 310,450, 9-11-90, Cl. D3-76.000.

Cat Eye Co., Ltd.: *See*—
Kagayama, Jou, 310,495, Cl. D10-98.000.

CertainTeed Corporation: *See*—
Reisinger, Ludwig; Westphal, Dennis; and Piles, Jonathan, 310,572, Cl. D25-119.000.

Chanel, Arthur, to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole. Package. 310,481, 9-11-90, Cl. D9-341.000.

Chanel, Arthur, to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole. Package. 310,486, 9-11-90, Cl. D9-425.000.

Chapin, Paul L. Baby bottle. 310,568, 9-11-90, Cl. D24-47.000.

Cigarette Racing Team, Inc.: *See*—
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 310,508, Cl. D12-317.000.

Cloverline, Inc., The: *See*—
Leopoldi, Nobret; and Heinrich, William, 310,575, Cl. D26-47.000.

Coath, Philip M.: *See*—
Greengrass, Stuart M.; Coath, Philip M.; Manoy, Russell; Muston, David; and Scagell, Andrew, 310,563, Cl. D24-9.000.

Coffee, P. Michael. Cribbage board. 310,493, 9-11-90, Cl. D10-46.100.

Colgate-Palmolive Company: *See*—
Paciullo, Francis P.; and Rivera, Ligia A., 310,589, Cl. D32-40.000.

Conti, Rino, to Dart Industries Inc. Colander or the like. 310,466, 9-11-90, Cl. D7-667.000.

Cors, Mark W., to Kohler Co. Toilet. 310,559, 9-11-90, Cl. D23-295.000.

Covington, Jay C.: *See*—
Scognamillo, Frank; and Covington, Jay C., 310,448, Cl. D3-61.000.

Creative Point, Inc.: *See*—
Long, Jerry M.; and Palmer, Peter W., 310,445, Cl. D3-35.000.

Dart Industries Inc.: *See*—
Conti, Rino, 310,466, Cl. D7-667.000.
Laib, Douglas M., 310,463, Cl. D7-614.000.
Laib, Douglas M., 310,464, Cl. D7-615.000.

Daucourt, Michel, to Camus La Grande Marque. Decanter with stopper. 310,484, 9-11-90, Cl. D9-384.000.

Davis, Julie L.: *See*—
Rogers, Amy J., 310,549, Cl. D21-157.000.

De Giovellina, Henri C., to Pochet S.A. Combined bottle and closure. 310,483, 9-11-90, Cl. D9-377.000.

DesignTime Company Limited: *See*—
Fong, Wa N., 310,490, Cl. D10-32.000.

Dezes, Robert, to U.S. Philips Corporation. Videotex terminal. 310,518, 9-11-90, Cl. D14-106.000.

Dezes, Robert, to U.S. Philips Corporation. Videotex terminal. 310,519, 9-11-90, Cl. D14-106.000.

Digital Equipment Corporation: *See*—
Maurer, Bernard; Faranda, Robert; and Wu, Thomas G., 310,514, Cl. D13-182.000.

Dobelle, Howard, to Andoe Inc. Pet carrying case. 310,586, 9-11-90, Cl. D30-109.000.

Dortch, Laurence E. Tool box drawer for pickup truck. 310,504, 9-11-90, Cl. D12-157.000.

Dressler, Bernd J. Scissors. 310,469, 9-11-90, Cl. D8-57.000.

Durand, Jean-Jacques. Pitcher. 310,461, 9-11-90, Cl. D7-318.000.

Easco Hand Tool, Inc.: *See*—
Mader, William G.; and Rowean, Paul J., 310,472, Cl. D8-82.000.

Eastman Kodak Company: *See*—
Lavine, Monte D., 310,536, Cl. D16-246.000.

Eksteen, Michael C.: *See*—
Bedocs, Lou; and Eksteen, Michael C., 310,511, Cl. D13-133.000.

Eldon Industries, Inc.: *See*—
Evenson, Mel, 310,544, Cl. D19-99.000.

Elkins, Johnny C. Gun rack for a vehicle. 310,446, 9-11-90, Cl. D3-38.000.

Etablissements Regnault: *See*—
Regnault, Pierre, 310,542, Cl. D19-43.000.

Evenson, Mel, to Eldon Industries, Inc. Base for a file assembly. 310,544, 9-11-90, Cl. D19-99.000.

Fabriche Automobile Ferrari Societa per Azioni Esercizio: *See*—
Fioravanti, Leonardo, 310,506, Cl. D12-196.000.

Faranda, Robert: *See*—
Maurer, Bernard; Faranda, Robert; and Wu, Thomas G., 310,514, Cl. D13-182.000.

Fellowes Manufacturing Inc.: *See*—
Bedard, Paul R., 310,520, Cl. D14-114.000.

Feng, Yee C. Integrated circuit insertion tool. 310,468, 9-11-90, Cl. D8-14.000.

Fioravanti, Leonardo, to Fabriche Automobile Ferrari Societa per Azioni Esercizio. Automobile door panel exterior surface. 310,506, 9-11-90, Cl. D12-196.000.

Fitzpatrick, William E., to Playtex Family Products, Inc. Trainer spout to be used in conjunction with a baby bottle. 310,567, 9-11-90, Cl. D24-47.000.

Fleecs, Gregory E. Lawn sprinkler support. 310,477, 9-11-90, Cl. D8-356.000.

Fong, Wa N., to DesignTime Company Limited. Wristwatch. 310,490, 9-11-90, Cl. D10-32.000.

Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole: *See*—
Chanel, Arthur, 310,481, Cl. D9-341.000.
Chanel, Arthur, 310,486, Cl. D9-425.000.

Fry, Roger P., to Gympac Systems Limited. Housing for exercise cycle or similar article. 310,550, 9-11-90, Cl. D21-194.000.

Fukuda, Nobuo: *See*—
Utsuki, Toshiyuki; Fukuda, Nobuo; Kwakatsu, Yoshihiro; and Iehara, Yasunari, 310,524, Cl. D14-151.000.

Fukuyama, Katsuo: *See*—
Hara, Masaki; Sakai, Masayuki; Sawatani, Masaharu; Yonezawa, Midori; and Fukuyama, Katsuo, 310,517, Cl. D14-106.000.

Fushiya, Fusao; and Ohta, Hajime, to Makita Electric Works, Ltd. Portable battery case. 310,509, 9-11-90, Cl. D13-103.000.

G-C Dental Industrial Corporation: *See*—
Kujirai, Osamu, 310,582, Cl. D28-64.000.

Gantner, Robert J. Shade for an automobile steering wheel and seat. 310,502, 9-11-90, Cl. D12-155.000.

Garrett, Robert L.; and Lauvray, Gregory A. Specialized circle cutter. 310,533, 9-11-90, Cl. D15-139.000.

Geiger, Reinold, to Ateliers de Moulage Specialise Packaging. Dispenser for scented liquids. 310,480, 9-11-90, Cl. D9-300.000.

Genaro, Donald M., to Henry Dreyfuss Associates. Toothpaste tube or the like. 310,487, 9-11-90, Cl. D9-371.000.

Gipe, Thomas A. Flower box support. 310,459, 9-11-90, Cl. D6-556.000.

Gold Star Co., Ltd.: *See*—
Yang, Doo S., 310,522, Cl. D14-129.000.

Goodyear Tire & Rubber Company, The: *See*—
Lobosco, William A., 310,443, Cl. D2-323.000.

Gotou, Toyokichi, to Newlong Machine Works, Ltd. Industrial sewing machine. 310,532, 9-11-90, Cl. D15-69.000.

Gowens, Robert B.: *See*—
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 310,508, Cl. D12-317.000.

Green, Stephen T.: *See*—
Castelli, Renato P.; Van Hoye, Willibald; Miles, Richard; and Green, Stephen T., 310,450, Cl. D3-76.000.

Greenfield Diecasting Corp.: *See*—
Grenell, David, 310,476, Cl. D8-353.000.

Greengrass, Stuart M.; Coath, Philip M.; Manoy, Russell; Muston, David; and Scagell, Andrew. Storage case for medical instrument. 310,563, 9-11-90, Cl. D24-9.000.

Gregory, Joseph A.: *See*—
Barrett, William H.; Gregory, Joseph A.; Mohr, Lisa M.; and Schaum, David L., 310,535, Cl. D16-241.000.

Grenell, David, to Greenfield Diecasting Corp. Weather-resistant assembly for protecting outdoor duplex electrical receptacles. 310,476, 9-11-90, Cl. D8-353.000.

Grzebyk, Allen C. Christmas tree stand. 310,499, 9-11-90, Cl. D11-130.100.

Gympac Systems Limited: *See*—
Fry, Roger P., 310,550, Cl. D21-194.000.

Halter, Gregory S.: *See*—
West, Scott W.; Streeter, Leslie C.; and Halter, Gregory S., 310,551, Cl. D21-219.000.

Hara, Masaki; Sakai, Masayuki; and Kato, Minoru, to Mitsubishi Denki Kabushiki Kaisha. Computer keyboard. 310,516, 9-11-90, Cl. D14-100.000.

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Lang, Karen, to Beckman Instruments, Inc. Wall mount for a pH meter or similar article. 310,478, 9-11-90, Cl. D8-373.000.
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Wu, Thomas G.: *See*—
Maurer, Bernard; Faranda, Robert; and Wu, Thomas G., 310,514, Cl. D13-182.000.
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Yokoi, Toshihisa: *See*—
Hino, Ichiro; and Yokoi, Toshihisa, 310,523, Cl. D14-137.000.
Yonezawa, Midori: *See*—
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Holden, Douglas, 7,322, Cl. 68.000.
Gardner, Leith M.: *See*—
Zaiger, Chris F.; Gardner, Leith M.; Zaiger, Gary N.; and Zaiger, Grant G., 7,320, Cl. 37.000.
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CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 11, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

12 4,955,087
403 4,955,088
410 4,955,089

CLASS 4

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26 D 4,955,606
29 A 4,955,608
162 F 4,955,609
169 4,955,610
195 A 4,955,611
200 B 4,955,612
218 4,955,613
4,955,966
240 4,955,614
241 4,955,615
249 4,955,616
256 4,955,617
258 4,955,618
273 4,955,619
372 4,955,967
428 4,955,620

CLASS 277

166 4,955,621

CLASS 279

15 4,955,622
60 4,955,623

CLASS 280

42 4,955,624
47.31 4,955,625
87.042 4,955,626
236 4,955,627
239 4,955,628
407 4,955,629
419 4,955,630
438.1 4,955,631
507 4,955,968
607 4,955,632
633 4,955,633
675 4,955,634
4,955,635
749 4,955,636
801 4,955,637
806 4,955,638
808 4,955,639
824 4,955,969

CLASS 281

2 4,955,640

CLASS 285

93 4,955,642
96 4,955,641
149 4,955,970
190 4,955,643
333 4,955,644
335 4,955,645

CLASS 292

85 4,955,646
258 4,955,648

CLASS 294

1.1 4,955,649
7 4,955,971
14 4,955,647
26 4,955,650
68.26 4,955,972
82.19 4,955,651
86.4 4,955,654
93 4,955,655
100 4,955,656
106 4,955,652
118 4,955,657
119.1 4,955,653

CLASS 296

65.1 4,955,973
75 4,955,658
146 4,955,659
165 4,955,660
171 4,955,661
192 4,955,662
194 4,955,663
204 4,955,664

CLASS 297

4 4,955,665
182 4,955,666
446 4,955,667

CLASS 299

42 4,955,668

CLASS 301

1 4,955,669
37 R 4,955,670
127 4,956,319

CLASS 303

92 4,955,671
113 4,955,673
114 4,955,674

CLASS 307

10.1 4,956,561
10.8 4,956,562
66 4,956,563
201 4,956,564
243 Re.33,331
254 4,956,565
261 4,956,566
310 4,956,567
352 4,956,568
443 4,956,569
570 4,956,570

CLASS 310

90.5 4,956,571
233 4,956,572

CLASS 312

107.5 4,955,672
214 4,955,675
4,955,676
290 4,955,677
320 4,955,678
321.5 4,955,679
340 4,955,160

CLASS 313

15 4,956,573
306 4,956,574
422 4,956,575
495 4,955,681
533 4,956,576
634 4,956,577

CLASS 315

3 4,956,578
58 4,956,579
83 4,956,580
101 4,956,581
111.21 4,956,582
220 4,956,583
241 R 4,956,584
371 4,956,585
382 4,955,680
387 4,956,586
408 4,956,587

CLASS 318

16 4,956,588
67 4,956,589
432 4,956,590
483 4,956,591
560 4,956,592
561 4,956,593
568.1 4,956,594
696 4,956,595
801 4,956,596

CLASS 320

14 4,956,597

CLASS 322
28 4,956,598
CLASS 323
244 4,956,599
CLASS 324
103 R 4,956,600
154 PB 4,956,601
158 D 4,956,603
158 F 4,956,604
4,956,605
158 R 4,956,602
207.12 4,956,606
244 4,956,607
319 4,956,608
322 4,956,609
425 4,956,610
699 4,956,611
CLASS 328
5 4,956,612
CLASS 330
4.3 4,956,619
10 Re.33,333
253 4,956,613
286 4,956,614
288 4,956,615
297 4,956,616
CLASS 331
96 4,956,617
116 FE 4,956,618
CLASS 333
21 R 4,956,620
104 4,956,621
125 4,956,622
CLASS 335
32 4,956,624
128 4,956,623
290 4,956,625
CLASS 336
60 4,956,626
65 4,956,627
CLASS 340
323 R 4,956,628
429 4,956,629
433 4,956,630
436 4,956,631
463 4,956,632
471 4,956,633
521 4,956,634
540 4,956,635
551 4,956,636
644 4,956,637
701 4,956,638
707 4,956,639
799 4,956,640
825.44 4,956,641
CLASS 341
133 4,956,642
CLASS 342
51 4,956,643
351 4,956,644
361 4,956,645
CLASS 343
706 4,956,646
901 4,956,647
CLASS 346
1.1 4,956,648
107 R 4,956,649
108 4,956,650
4,956,651
139 R 4,956,652
140 R 4,956,653
4,956,654
CLASS 350
3.67 4,955,974
6.8 4,955,682
96.19 4,955,975
96.20 4,955,683
4,955,684
4,955,686
96.21 4,955,976
96.25 4,955,687
96.29 4,955,688
96.3 4,955,685
96.34 4,955,689
4,955,977
105 4,955,690
162.13 4,955,691
166 4,955,692
319 4,955,693
320 4,955,694
331 R 4,955,695
332 4,955,696
4,955,697
336 4,955,698
353 4,955,699
423 4,955,700
481 4,955,701
523 4,955,978
556 4,955,702
637 4,955,703
4,955,704
642 4,955,705
CLASS 351
41 4,955,706
44 4,955,708
46 4,955,709
47 4,955,707
156 4,955,710
160 R 4,955,711
169 4,955,712
200 4,955,713
CLASS 353
62 4,955,714
101 4,956,655
CLASS 354
155 4,955,715
173.1 4,956,656
195.12 4,956,657
212 4,956,658
400 4,956,659
402 4,956,660
412 4,956,661
CLASS 355
27 4,956,662
38 4,956,663
43 4,956,664
50 4,956,665
201 4,956,666
202 4,956,667
208 4,956,668
4,956,669
210 4,956,670
215 4,956,671
243 4,956,672
245 4,956,673
251 4,956,674
4,956,675
271 4,956,676
303 4,956,677
318 4,956,678
326 4,956,679
CLASS 356
152 4,955,716
316 4,955,717
356 4,955,718
359 4,955,719
429 4,955,720
CLASS 357
4 4,956,680
4,956,681
16 4,956,682
17 4,956,683
4,956,684
23.4 4,956,700
30 4,956,685
4,956,686
4,956,687
34 4,956,688
4,956,689
38 4,956,690
41 4,956,691
49 4,956,692
64 4,956,693
74 4,956,694
4,956,695
79 4,956,696
81 4,956,697
91 4,956,698
CLASS 358
11 4,956,701
75 4,956,702
76 4,956,703
80 4,956,704
88 4,956,705
93 4,956,706
140 4,956,707
4,956,708
147 4,956,709
149 4,956,699
188 4,956,710
191.1 4,956,711
198 4,956,712
209 4,956,713
213.11 4,956,714
213.19 4,956,715
213.27 4,956,716
296 4,956,717
298 4,956,718
310 4,956,719
324 4,956,720
402 4,956,721
444 4,956,722
449 4,956,723
CLASS 360
8 4,956,724
14.3 4,956,725
27 4,956,726
49 4,956,727
66 4,956,728
67 4,956,729
70 4,956,730
96.3 4,956,731
4,956,732
105 4,956,733
4,956,734
106 4,956,735
113 4,956,736
122 4,956,737
CLASS 361
8 4,956,738
16 4,956,739
19 4,956,740
45 4,956,743
95 4,956,741
131 4,956,742
321 4,956,744
383 4,956,745
385 4,956,746
392 4,956,747
394 4,956,748
414 4,956,749
415 4,956,750
CLASS 362
1 4,956,751
72 4,956,752
74 4,956,753
101 4,956,754
206 4,956,755
226 4,956,756
252 4,956,757
285 4,956,758
297 4,956,759
CLASS 363
16 4,956,760
19 4,956,761
65 4,956,762
CLASS 364
154 4,956,763
167.01 4,956,764
192 4,956,765
200 Re.33,328
4,956,766
4,956,767
4,956,768
4,956,769
4,956,770
4,956,771
4,956,772
4,956,773
4,956,774
411 4,956,775
424.02 4,956,777
424.1 4,956,776
426.04 4,956,778
426.05 4,956,779
428 4,956,780
431.04 4,956,781
464.03 4,956,782
468 4,956,783
4,956,784
474.01 4,956,785
474.02 4,956,786
474.24 4,956,787
498 4,956,788
508 4,956,789
513 4,956,790
4,956,791
517 4,956,792
558 4,956,793
559 4,956,794
571.03 4,956,795
581 4,956,796
703 4,956,797
718 4,956,798
729 4,956,799
736 4,956,800
748 4,956,801
787 4,956,802
900 4,956,803
4,956,804
4,956,805
4,956,806
4,956,807
4,956,808
4,956,809
4,956,810
CLASS 365
51 4,956,811
119 4,956,812
127 4,956,813
154 4,956,814
4,956,815
189.01 4,956,817
189.08 4,956,818
201 4,956,816
4,956,819
222 4,956,820
CLASS 366
8 4,956,821
24 4,955,721
25 4,955,722
136 4,955,723
314 4,955,724
CLASS 367
23 4,956,822
84 4,956,823
129 4,956,824
CLASS 368
9 4,956,825
28 4,956,826
69 4,956,827
76 4,956,828
185 4,956,829
280 4,956,830
CLASS 369
32 4,956,831
44.11 4,956,832
46 4,956,833
CLASS 370
1 4,956,834
16 4,956,835
16.1 4,956,836
20 4,956,837
32.1 4,956,838
60 4,956,839
65.5 4,956,840
94.1 4,956,841
CLASS 371
37.4 Re.33,332
62 4,956,842
CLASS 372
22 4,955,725
23 4,956,843
44 4,956,844
56 4,956,845
58 4,956,846
87 4,956,847
4,956,848
CLASS 373
120 4,956,849
CLASS 374
57 4,955,726
124 4,955,727
4,955,728
131 4,955,979
185 4,955,980
CLASS 375
3 4,956,850
8 4,956,851
4,956,852
102 4,956,853
111 4,956,854
CLASS 378
45 4,956,855
88 4,956,856
110 4,956,857
133 4,956,858
157 4,956,859
CLASS 379
100 4,956,860
142 4,956,861
CLASS 380
19 4,956,862
30 4,956,863
34 4,956,864
CLASS 381
31 4,956,871
43 4,956,865
4,956,866
68 4,955,729
94.1 4,956,867
189 4,956,868
CLASS 382
22 4,956,869
30 4,956,870
44 4,956,872
54 4,956,873
56 4,956,874
CLASS 383
86 4,955,981
CLASS 384
133 4,955,731
484 4,955,732
CLASS 400
17 4,955,733
63 4,955,734
83 4,955,735
120 4,955,736
208 4,955,737
229 4,955,738
CLASS 401
65 4,955,739
119 4,955,745
131 4,955,746
139 4,955,747
140 4,955,748
CLASS 403
11 4,955,749
27 4,955,740
57 4,955,741
246 4,955,742
254 4,955,743
259 4,955,744
306 4,955,750
CLASS 404
1 4,955,751
2 4,955,752
6 4,955,753
11 4,955,982
108 4,955,754
CLASS 405
128 4,955,983
155 4,955,755
179 4,955,756
184 4,955,757
261 4,955,758
270 4,955,759
4,955,760
CLASS 406
12 4,955,761
88 4,955,762
CLASS 408
40 4,955,763
59 4,955,764
67 4,955,984
87 4,955,765
4,955,766
146 4,955,767
CLASS 409
10 4,955,768
12 4,955,769
137 4,955,770
CLASS 410
94 4,955,771
CLASS 411
175 4,955,772
B1 4,729,706
429 4,955,773
457 4,955,813
CLASS 414
111 4,955,774
152 4,955,775
426 4,955,777
525.2 4,955,776
534 4,955,778
723 4,955,779
744.2 4,955,780
786 4,955,781
789.5 4,955,782
790.4 4,955,794
795 4,955,783
796.4 4,955,784
CLASS 415
26 4,955,785
110 4,955,786
118 4,955,787
150 4,955,788
201 4,955,789
CLASS 417
44 4,955,795
45 4,955,790
354 4,955,791
399 4,955,792
423.11 4,955,793
547 4,955,796
CLASS 418
15 4,955,797
257 4,955,985
CLASS 419
31 4,955,798
CLASS 420
580 4,956,144
CLASS 422
28 4,956,145
56 4,956,146
64 4,956,148
68.1 4,956,149
102 4,956,150
103 4,956,151
181 4,956,152
249 4,956,153
297 4,956,155
300 4,956,156
CLASS 423
54 4,956,154
104 4,956,157
111 4,956,158
135 4,956,159
231 4,956,160
235 4,956,161
244 4,956,162
302 4,956,163
306 4,956,164
4,956,165
328 4,956,166
339 4,956,167
386 4,956,168
502 4,956,169
CLASS 424
54 4,956,172
63 4,956,173
4,956,174
72 4,956,175
81 4,956,170
93 4,956,177
114 4,956,179
118 4,956,180
448 4,956,181
449 4,956,171
476 4,956,182
551 4,956,178
630 4,956,183
661 4,956,184
CLASS 425
47 4,955,799
63 4,955,800
72.1 4,955,802
92 4,955,801
145 4,955,803
548 4,955,804
CLASS 426
43 4,956,185
4,956,186
46 4,956,187
74 4,956,188
233 4,956,189
269 4,956,190
271 4,956,429
330.3 4,956,191
425 4,956,192
478 4,956,176
573 4,956,193
592 4,956,194
600 4,956,195
CLASS 427
38 4,956,196
39 4,956,197
54.1 4,956,198
133 4,956,200
173 4,956,199
181 4,956,201
215 4,956,202
221 4,956,203
248.1 4,956,204
299 4,956,205
387 4,956,206
CLASS 428
34.2 4,956,207
34.6 4,956,208
35.2 4,956,209
35.3 4,956,210
36.5 4,956,211
4,956,234
36.6 4,956,212
64 4,956,213
4,956,214
4,956,215
4,956,216
102 4,956,218
116 4,956,217
137 4,956,219
141 4,956,220
142 4,956,221
212 4,956,222
4,956,223
213 4,956,224
216 4,956,225
323 4,956,226
331 4,956,227
336 4,956,228
4,956,229
341 4,956,230
343 4,956,231
349 4,956,232
4,956,233
368 4,956,235
373 4,956,236
398 4,956,237

408 4,956,238
411.1 4,956,239
423.7 4,956,240
516 4,956,241
606 4,956,242
694 4,956,243

CLASS 429

17 4,956,244
26 4,956,245
104 4,956,246
194 4,956,247
4,956,248

CLASS 430

5 4,956,249
58 4,956,250
4,956,277
59 4,956,255
96 4,956,256
109 4,956,258
137 4,956,259
138 4,956,251
4,956,252
4,956,253
4,956,254
4,956,260
4,956,309
156 4,956,261
162 4,956,262
264 4,956,257
4,956,263
281 4,956,264
283 4,956,265
311 4,956,298
325 4,956,266
372 4,956,267
393 4,956,268
505 4,956,269
527 4,956,270

CLASS 431

1 4,955,805
24 4,955,806
296 4,955,807

CLASS 432

5 4,955,808
14 4,955,986
59 4,956,271
247 4,955,809

CLASS 433

72 4,955,810
173 4,955,811

CLASS 434

16 4,955,812

CLASS 435

1 4,956,272
5 4,956,273
7 4,956,274
4,956,275
12 4,956,276
30 4,956,278
42 4,956,279
69.1 4,956,280
69.3 4,956,281
69.51 4,956,282
76 4,956,283
123 4,956,284
126 4,956,285
134 4,956,286
4,956,287
172.3 4,956,288
180 4,956,289
189 4,956,290
200 4,956,291
235 4,956,292
252.1 4,956,294
4,956,295
4,956,296
252.33 4,956,293
253.2 4,956,297

CLASS 436

18 4,956,299
66 4,956,300
87 4,956,301
161 4,956,302
542 4,956,303

CLASS 437

5 4,956,304
31 4,956,305
34 4,956,306
40 4,956,307
41 4,956,308
52 4,956,310
57 4,956,311
180 4,956,312
203 4,956,313
241 4,956,314

CLASS 439

60 4,955,817
66 4,955,818
77 4,955,814
79 4,955,819
83 4,955,820
133 4,955,821
350 4,955,815
421 4,955,816
505 4,955,822
507 4,955,823
510 4,955,824
535 4,955,825
578 4,955,826
595 4,955,827
668 4,955,828
719 4,955,829
821 4,955,830

CLASS 440

1 4,955,831
9 4,955,832
49 4,955,833
63 4,955,834
77 4,955,836
88 4,955,837
89 4,955,838
101 4,955,839

CLASS 441

74 4,955,835

CLASS 446

17 4,955,840
46 4,955,841
4,955,842
160 4,955,843
330 4,955,844
397 4,955,845

CLASS 488

69 4,955,846

CLASS 488

13 4,956,875
78 4,956,876
605 4,956,877

CLASS 464

111 4,955,847

CLASS 474

23 4,955,848
80 4,955,849
92 4,955,850

CLASS 475

59 4,955,851
146 4,955,852
241 4,955,853

CLASS 493

404 4,955,855

CLASS 501

87 4,956,315
88 4,956,316
92 4,956,317
96 4,956,318
137 4,956,320
146 4,956,321

CLASS 502

1.78 4,956,326
63 4,956,322
113 4,956,323
163 4,956,324
4,956,325
216 4,956,327
242 4,956,328
251 4,956,329
326 4,956,330
339 4,956,331

CLASS 503

209 4,956,332
4,956,333

CLASS 505

1 4,956,334
4,956,335
4,956,336
4,956,337
4,956,338
4,956,339
4,956,340

CLASS 512

23 4,956,341
24 4,956,342

CLASS 514

11 4,956,343
18 4,956,344
46 4,956,345
47 4,956,348
50 4,956,346
54 4,956,347
4,956,349
4,956,350
55 4,956,351
58 4,956,352
63 4,956,353
65 4,956,354
157 4,956,355
178 4,956,357
4,956,358
202 4,956,359
210 4,956,360
215 4,956,361
217 4,956,362
4,956,364
227.5 4,956,363
232.2 4,956,365
233.2 4,956,366
235.1 4,956,367
236.2 4,956,368
254 4,956,369
274 4,956,370
275 4,956,371
307 4,956,372
311 4,956,373
321 4,956,356
341 4,956,374
342 4,956,375
361 4,956,376
381 4,956,377
404 4,956,378
4,956,379
406 4,956,380
422 4,956,381
443 4,956,382
4,956,383
467 4,956,384
470 4,956,385
494 4,956,386
503 4,956,387
522 4,956,388
651 4,956,389
654 4,956,390
747 4,956,391
810 4,956,392

CLASS 518

712 4,956,393

CLASS 521

54 4,956,395
79 4,956,394
84.1 4,956,396
85 4,956,397

CLASS 523

138 4,956,398
209 4,956,399
223 4,956,400
4,956,401
310 4,956,402
415 4,956,403

CLASS 524

5 4,956,404
11 B1 4,866,110
48 4,956,405
100 4,956,406
119 4,956,407
120 4,956,408
147 4,956,409
211 4,956,497
474 4,956,498
492 4,956,499
500 4,956,500

CLASS 525

54.5 4,956,501
64 4,956,410
73 4,956,412
190 4,956,413
192 4,956,414
196 4,956,415
280 4,956,416
327.6 4,956,417
327.7 4,956,418
330.6 4,956,419
342 4,956,420
351 4,956,421
385 4,956,422
392 4,956,423
432 4,956,424
462 4,956,425
524

CLASS 526

60 4,956,426
62 4,956,427
190 4,956,428
195 4,956,430
227 4,956,431
264 4,956,432
265 4,956,433
318.2 4,956,434

CLASS 528

17 4,956,435
18 4,956,436
26 4,956,437
53 4,956,439
60 4,956,438
93 4,956,411
99 4,956,440
171 4,956,441
205 4,956,442
206 4,956,443
220 4,956,444
230 4,956,445
272 4,956,446
4,956,447
4,956,448
353 4,956,450
4,956,451

CLASS 530

324 4,956,449
387 4,956,452
389 4,956,453
4,956,454
399 4,956,455

CLASS 534

615 4,956,456
643 4,956,457

CLASS 536

112 4,956,458
121 4,956,459

CLASS 544

234 4,956,460
240 4,956,118
258 4,956,461
263 4,956,462
320 4,956,463

CLASS 546

57 4,956,464
156 4,956,465

CLASS 548

101 4,956,466
112 4,956,467
200 4,956,468
251 4,956,469
337 4,956,470
344 4,956,471
406 4,956,472
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D1—	127	310,440		667	310,466			310,492			310,518		99	310,544			310,570
D2—	314	310,441	D8—	14	310,467		46.1	310,493			310,519	D20—	10	310,545	D25—	1	310,571
		310,442			310,468		75	310,494		114	310,520			310,546		119	310,572
	323	310,443		57	310,469		98	310,495			310,521	D21—	11	310,547	D26—	35	310,573
D3—	30.1	310,444		62	310,470		106	310,496		129	310,522		86	310,548		44	310,574
	35	310,445		72	310,471		109	310,497		137	310,523		157	310,549		47	310,575
	38	310,446		82	310,472	D11—	35	310,498		151	310,524		194	310,550		58	310,576
	61	310,447		90	310,473		130.1	310,499		162	310,525		219	310,551		67	310,577
		310,448		99	310,474			310,500		163	310,526		246	310,552	D27—	187	310,578
	62	310,449			310,475	D12—	97	310,501			310,527	D22—	115	310,553	D28—	2	310,579
	76	310,450		353	310,476		155	310,502			310,528		149	310,554		46	310,580
D6—	337	310,451		356	310,477		156	310,503		168	310,529	D23—	213	310,555		59	310,581
	361	310,452		373	310,478		157	310,504		205	310,530		265	310,556		64	310,582
	372	310,453		376	310,479		187	310,505	D15—	11	310,531		275	310,557			310,583
	470	310,454	D9—	300	310,480		196	310,506		69	310,532		295	310,558		64.1	310,584
	491	310,455		341	310,481		202	310,507		139	310,533			310,559	D29—	7	310,585
		310,456		344	310,482		317	310,508	D16—	214	310,534		313	310,560	D30—	109	310,586
	525	310,457		371	310,487	D13—	103	310,509		241	310,535		377	310,561		161	310,587
	531	310,458		377	310,483		128	310,510		246	310,536		386	310,562			310,588
	556	310,459		384	310,484		133	310,511	D17—	22	310,537	D24—	9	310,563	D32—	40	310,589
	583	310,460		418	310,488		146	310,512			310,538		23	310,564		49	310,590
D7—	318	310,461		424	310,485			310,513	D18—	40	310,539		34	310,565		60	310,591
	504	310,462		425	310,486		182	310,514		42	310,540		38	310,566		70	310,592
	614	310,463	D10—	24	310,489	D14—	100	310,515		43	310,541		47	310,567	D34—	27	310,593
	615	310,464		32	310,490			310,516	D19—		310,542			310,568		28	310,594
	644	310,465		46	310,491		106	310,517		76	310,543		51	310,569			

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49 : 4,955,983
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53 : 4,956,494
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43 : 4,955,136
44 : 4,955,421
45 : 4,955,117
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46 : 4,955,631
47 : 4,955,210
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4,955,604
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54 : 4,955,896
4,956,347
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55 : 4,956,632
48 : 4,955,095
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4,956,820
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49 : 4,955,599
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50 : 4,955,495
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51 : 4,955,230
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53 : 4,955,164
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4,956,780
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54 : 4,955,942
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55 : 4,955,113
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4,955,963
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4,956,100
4,956,170
4,956,295
4,956,556
4,956,750
4,956,858

DESIGN PATENTS

01 :	310,590		310,564		310,494		310,577		310,534		310,561
04 :	310,549		310,568		310,502	28 :	310,554		310,535	44 :	310,447
05 :	310,530		310,573		310,571	30 :	310,553		310,536		310,485
	310,566		310,576		310,575	31 :	310,477		310,578		310,585
06 :	310,445		310,583	20 :	310,504	33 :	310,443		310,584	48 :	310,446
	310,453		310,587		310,572		310,482		310,586		310,479
	310,465		310,588	24 :	310,441	34 :	310,440	39 :	310,456		310,545
	310,467	08 :	310,501		310,459		310,458		310,533		310,570
	310,469	09 :	310,475		310,510		310,487		310,555		310,580
	310,478		310,515	25 :	310,463		310,560	40 :	310,471		310,591
	310,492	12 :	310,454		310,464		310,567		310,507	54 :	310,474
	310,493		310,491		310,466		310,574		310,552	55 :	310,451
	310,497		310,508		310,514		310,589		310,442		310,546
	310,543		310,548	26 :	310,499	36 :	310,476	41 :	310,551		310,558
	310,544		310,581		310,579		310,488		310,472		310,559
	310,556	17 :	310,448	27 :	310,462		310,496	42 :			

PLANT PATENTS

06 : 7,320	7,321	7,322	7,324	7,325	

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